

# SIEMENS

## SONOLINE G60 S Ultrasound Imaging System [1] Instructions for Use





# **SONOLINE G60 S**

## **Ultrasound Imaging System**

### **[1] Instructions for Use**

#### **Software Version 10**

Siemens Medical Solutions USA, Inc.  
Ultrasound Division  
1230 Shorebird Way  
Mountain View, CA 94043-1344  
U.S.A.

(800) 498-7948  
(650) 969-9112

#### **CE Declaration**

For systems affixed with a CE mark: This product is provided with a CE marking in accordance with the regulations stated in Council Directive 93/42/EEC of June 14, 1993 concerning Medical Devices. Siemens Medical Solutions USA, Inc., is certified by Notified Body 0123 to Annex II.3 – Full Quality System.

Authorized EC Representative:  
Siemens Aktiengesellschaft  
Medical Solutions  
Henkestraße 127  
D-91052 Erlangen  
Germany

©2006 Siemens Medical Solutions USA, Inc.  
All Rights Reserved.

February 2006

Manuals distributed from the United States of America are printed in the United States of America.

SONOLINE G60 S, Axisus, DTI, *fourSight*, SieScape, MultiHertz, DIMAQ, microCase, ErgoDynamic, SynAps, QuickSet, SuppleFlex, Crescendo, and Evolve Package are trademarks of Siemens Medical Solutions USA, Inc.

Windows, CIDEX, CIDEX Plus, CIDEX OPA, Milton, Virkon, and Gigasept FF are registered trademarks of their respective owners.

Siemens reserves the right to change system specifications at any time.



# Table of Contents

## [1] Instructions for Use

Chapter Title	Chapter Description
<b>Chapter 1 Introduction</b>	General overview of the diagnostic ultrasound imaging system, including system options, features, and design.
<b>Chapter 2 Safety and Care</b>	Detailed information on system safety and how to care for and maintain the system, transducers, and transducer accessories.
<b>Chapter 3 System Controls</b>	Explanation of all controls and keys on the control panel, including the LCD, alphanumeric keyboard, and optional footswitch.
<b>Chapter 4 System Setup</b>	Detailed descriptions of how to transport, set up, and prepare the system for use, including transducer connection and system startup procedures.
<b>Chapter 5 Beginning an Examination</b>	Information on starting an examination, including instructions for entering and editing patient data and selecting an exam type, imaging mode, and transducer.
<b>Chapter 6 Technical Description</b>	Technical description of the ultrasound system.

**Note:** Not all features and options described in this publication are available to all users. Please check with your Siemens representative to determine the current availability of features and options.



## About This Manual

The Instructions for Use consists of two volumes:

- [1] Instructions for Use

The [1] *Instructions for Use* includes both a general overview and a technical description of the ultrasound imaging system. This manual contains detailed information on the safety and care of the ultrasound system and its transducers. A chapter is dedicated to the description of all system controls. The [1] *Instructions for Use* also includes the procedures for system setup and beginning an exam.

- [2] Instructions for Use

The [2] *Instructions for Use* includes procedures for acquiring and optimizing images. This manual provides procedures for general and exam-specific measurements and calculations.

The *System Reference* provides reference information for the ultrasound imaging system.

The *Electromagnetic Emissions and Immunity: Guidance and Manufacturer's Declaration* publication provides information regarding the electromagnetic compatibility (EMC) testing of this system.

# Conventions

Conventions used throughout this manual are listed below. Take a moment to familiarize yourself with these conventions.

## Cross-References

This manual provides you information by topic. When additional information exists within this or other manuals, a reference graphic and the name of the book is provided in the right column. If the information exists within the chapter, a cross-reference to the page number is listed. Otherwise, information is referenced by chapter number.

## System Presets

You can use the options and settings available in the system presets menu to set up the ultrasound system with your preferences. Presets define the configuration of the system software whenever you power on the system.

A complete listing of system presets is located in the *System Reference*. Whenever a system preset is discussed in other chapters or in the User and Reference Manuals, a graphic is provided in the right column.

The graphic identifies a preset option or setting in the system presets menu that is available for you to customize your ultrasound system. The name of the category on the menu containing the system preset is listed for your convenience.

### [1] Instructions for Use

Screen Saver	Ch 1
Intended Use	Ch 1

### [2] Instructions for Use

Imaging Functions	Ch A1
-------------------	-------

### System Reference

Accessories and Options	Ch 2
----------------------------	------





### F4

Default Settings
► Automatic Freeze Response



## Warnings, Cautions, and Notes

 **WARNING:** Warnings are intended to alert you to the importance of following the correct operating procedures where risk of injury to the patient or system user exists.

 **Caution:** Cautions are intended to alert you to the importance of following correct operating procedures to prevent the risk of damage to the system.

**Note:** Notes contain information concerning the proper use of the system and/or correct execution of a procedure.

## Control Panel Keys, Controls, and LCD Selections

Keys and controls located on the control panel are identified by uppercase, boldface type.

*Example:* Rotate the **ZOOM** control.

Function keys located on the keyboard are identified by the number of the function key.

*Example:* Press the **F4** key.

LCD keys are indicated by a (●) symbol with the name of the selection in boldface type.

*Example:* Press **●Next** to access the second page of LCD selections.

## Selection of On-Screen Objects

The **SET** key on the control panel functions as a point-and-select device (similar to a computer mouse) when used with the trackball. To select an on-screen object such as a button or a ▼ symbol, roll the trackball to position the pointer (cursor) on the object and then press the **SET** key on the control panel.

In this manual, the term "select" or "click" describe the trackball and **SET** key action required to select an on-screen object. In the example below, phrases A, B, C, and D are equivalent actions.

- A. Roll the trackball to the **Search** button and then press the **SET** key.
- B. Select the **Search** button.
- C. Click the **Search** button.
- D. Click **Search**.

## Special Terms and Menu Options

Special terms are indicated in boldface italics and are accompanied by a brief description on their first use in the manual.

*Example:* Provides on-screen anatomical graphics of ***pictograms*** that indicate the anatomy under evaluation.

Within a procedure, options in the system presets are identified in text as boldface type.

*Example:* Highlight the **Keyboard – Annotation** option.

# 1 Introduction

---

<b>System Overview .....</b>	<b>3</b>
Language Formats.....	3
Transducers .....	3
<b>Intended Use.....</b>	<b>4</b>
<b>Operating Modes.....</b>	<b>5</b>
<b>Image Screen Layout .....</b>	<b>6</b>
Screen Saver .....	6
<b>Documentation and Storage Devices.....</b>	<b>8</b>
<b>Measurements and Reports .....</b>	<b>9</b>
<b>User-Defined System Settings.....</b>	<b>10</b>
QuickSets .....	10



## System Overview

The G60 S system is a portable, scalable all-digital, diagnostic ultrasound imaging system for multi-specialty and a variety of specialty and general applications. The system software supports exam-specific imaging presets, measurements, pictograms, annotations, reports, worksheets, and system diagnostics.

The system utilizes advanced imaging processing and transducer technology. The operating system is based on Windows® technology.

Portable system design and the user interface with its home base control panel design maximize user comfort and productivity. The operation functions of the system are packaged in a compact, mobile platform.

The system is equipped with a DIMAQ-IP integrated workstation. The workstation provides capabilities for digital acquisition, storage, and review of ultrasound studies. Additional system options provide integration into a networking environment.

### [1] Instructions for Use

Operating Modes	1-5
System Views	Ch 4
Technical	
Description	Ch 6
Software/Hardware	
Options	Ch 6

## Language Formats


Operating system software and control panel overlays support English, German, French, Spanish, and Italian languages.

## Transducers

Wideband transducer technology supports MultiHertz™ multiple frequency imaging. Multi-frequency capability is available for all imaging transducers.

You can connect multiple transducers to the imaging system, with one transducer being the **active** transducer.

## Intended Use

 **Caution:** In the United States of America, federal law restricts this device to sale or use by, or on the order of, a physician.

The G60 S™ ultrasound system supports the following applications:

- Abdominal
- Obstetrical
- Gynecological
- Endovaginal
- Urological
- Small Parts (Breast, Testicular, Thyroid)
- Cerebrovascular
- Emergency Medicine
- Musculoskeletal
- Orthopedic
- Cardiac (Requires the Cardiac Imaging Option)
- Peripheral vascular
- Cranial
- Endorectal
- Venous

### System Reference

---

Listing of  
Transducers  
and Intended  
Application Ch 1

# Operating Modes

**Important:** At the time of publication, A-mode was not cleared for use by the U.S. Food and Drug Administration. Before using A-mode, check the current regulations for the country in which you are using this system to determine if A-mode is cleared for use.

- **A-mode:** A-mode is the amplitude mode. It can be displayed in a 2D-mode image.
- **2D-mode:** 2D-mode is the default setting. When the system is powered on, the image screen displays in 2D-mode.
- **Split (B+B) mode:** Split mode creates side-by-side images from one 2D-mode image. The two images are simultaneously real-time or frozen.
- **Dual-mode:** Dual-mode displays two acquired 2D-mode images. Because the images are obtained separately, only one image at a time displays in real-time.
- **4B-mode:** 4B-mode displays four acquired 2D-mode images. One image at a time displays in real-time.
- **2D/M-mode:** 2D/M-mode displays a 2D image and an M-mode sweep.
- **Split 2D/M-mode:** Split 2D/M-mode displays simultaneous 2D-mode images with an M-mode sweep.
- **M-mode:** Full screen M-mode display is available.
- **Pulsed Doppler:** Pulsed Doppler can display a spectrum simultaneously with a 2D image. An update function is available to toggle a frozen 2D image with a real-time spectrum, or a real-time 2D image with a frozen spectrum. During 2D/M-mode with Doppler, the M-mode sweep is synchronized with the Doppler spectrum.
- **Steerable Continuous Wave Doppler:** (Requires the Cardiac Imaging Option) Steerable Continuous Wave Doppler is available when a phased array transducer is connected to an array port and the **CW** key is pressed.
- **Auxiliary Continuous Wave Doppler:** (Requires the Cardiac Imaging Option) Auxiliary Continuous Wave Doppler is available when a continuous wave (pencil) transducer is connected to the CW port and the **CW** key is pressed.
- **Color:** Color Flow displays in a 2D-mode image or M-mode sweep.
- **Power:** Power mode detects and assigns color to the energy generated by the reflections of blood flow.
- **Directional Power:** Directional power mode detects and assigns color to the energy and direction generated by the reflections of blood flow.

## Image Screen Layout

The monitor on the ultrasound system displays clinical images together with important operating parameters and patient data. There is a variety of on-screen overlays and graphical objects to aid in image evaluation.

Many **fields** or areas of data displayed on the screen are multi-functional. The image field can display a 2D-mode image, M-mode sweep, Doppler spectrum, and their combinations, sets of calipers, pictograms and annotation text, biopsy guidelines, and CINE icons. An image can be inverted on a vertical axis and reversed on a horizontal axis to facilitate viewing and measurements.

**EMC Note:** Operating the ultrasound imaging system in close proximity to sources of strong electromagnetic fields, such as radio transmitter stations or similar installations may lead to interference visible on the monitor screen. However, the device has been designed and tested to withstand such interference and will not be permanently damaged.

## Screen Saver

The screen saver feature automatically replaces the display with a blank screen after the system has been inactive for a specified number of minutes. Restore the screen display by pressing any key or adjusting any control. The first key that you press will restore the view without performing a function. Press the key again to execute the command.

### System Reference

System Presets Ch 3

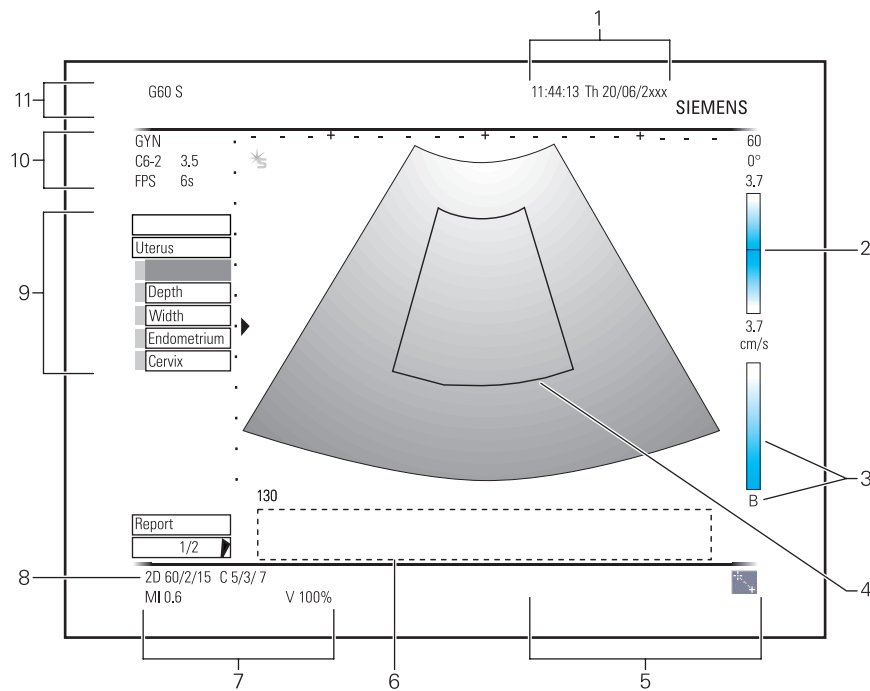


### F4

- Display
- Screen Saver Display
- Screen Saver Type Display
- Screen Saver Time



## Sample Image Screen



Example of a typical image screen.

- 1 **Time and Date**, including an abbreviation for the day of the week.
- 2 **Color bar**.
- 3 **Gray bar and gray map**.
- 4 Color window **region of interest (ROI)**.
- 5 **Trackball status icons**. Indicate the functions selectable by the trackball with green icons. Inactive icons are gray.
- 6 **Measured Results**. Displays values from measurements and calculations when the Measurement function is active.
- 7 **Transmit power** for 2D- and M-mode and the **MI** and **TI** values.
- 8 **Imaging Parameters**. Displays parameters for 2D-mode, Color Flow or Power, M-mode, and Doppler.
- 9 **Measurement Menu**. Access by pressing the **CALIPER** key. Indicates active measurement and for exams with a patient report, lists available labels.
- 10 Active **exam type**, **transducer**, and **frequency**, as well as the current **frame rate** of the transducer and **line density**.
- 11 Information for identifying the **patient**, **operator**, and the **hospital or clinic**.

# Documentation and Storage Devices

**⚠ Caution:** Peripheral devices specified for use with the ultrasound system are listed in the *System Reference*. Any use of other devices with the system is at the user's risk.

The system is configured with a CD/DVD combination disk drive for storage of system software, patient data, and images. An internal hard drive provides additional storage capacity.

You can connect a maximum of three image/report documentation devices to the system.

- Black and white video printer (standard equipment)
- Color video printer
- Videocassette recorder (VCR) or digital video recorder (DVD)

**Note:** Refer to the manufacturer's instructions for specific information concerning the operation of these devices.

**⚠ WARNING:** Accessory equipment connected to the analog and digital interfaces must be certified according to the respective EN and IEC standards (for example, EN 60950 and IEC 60950 for data processing equipment and EN 60601-1 and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standards EN 60601-1-1 and IEC 60601-1-1. Anyone who connects additional equipment to any of the signal input or signal output ports configures a medical system and is therefore responsible that the system complies with the requirements of the system standards EN 60601-1-1 and IEC 60601-1-1. Siemens can only guarantee the performance and safety of the devices listed in the *System Reference*. If in doubt, consult the Siemens service department or your local Siemens representative.

## System Reference

Accessories	Ch 2
and Options	Ch 2
CD/DVD drive	Ch 4
DIMAQ-IP	Ch 5

# Measurements and Reports

The measurement function is arranged by exam type and is available for use with all exam types. The ultrasound system has measurement and report packages for the following exam types:

- Cardiac (Requires the Cardiac Imaging Option)
- Obstetrics
- Early Obstetrics
- Gynecology
- Orthopedics
- Urology
- Cerebrovascular
- Peripheral vascular
- Venous
- EM (Emergency Medicine)
- Obstetrics (Japan) (For systems sold in Japan only)

Additional specialty measurements include Hip Dysplasia, Residual Volume, and Thyroid Volume.

## [2] Instructions for Use

Measurements and Reports:	
General	Ch B1
Obstetrical	Ch B2
Urology	Ch B4
Vascular	Ch B5
Cardiac	Ch B6
EM	Ch B7
QuickSets	Ch A1

## User-Defined System Settings

You can customize many features of the ultrasound system by using the system presets to designate default settings, or ***presets***. The values are stored in non-volatile memory and will remain intact when the system is powered off.

Each user of the system can determine settings for imaging preferences and default settings, then store them on a disk. Those user-defined settings can then be loaded along with new system software. The disk also serves as a backup.

## QuickSets

The ***QuickSet™*** feature allows you to capture an optimized configuration of imaging parameter settings for a combination of a specific transducer and exam.

### [2] Instructions for Use

---

QuickSets	Ch A1
-----------	-------

## 2 Safety and Care

---

<b>Operating Safety and Environment</b>	<b>3</b>
System Symbols	3
Labels	6
Biohazard Considerations	9
Acoustic Output ▪ Mechanical and Thermal Indices	10
Mechanical and Thermal Indices	11
Transmit Power Control	12
Transmit Power Display	13
Imaging Functions that Change Acoustic Output	14
Transducer Surface Temperature Limits	15
Electrical Safety	16
Level of Protection Against Electrical Shock ▪ System	17
Level of Protection Against Electrical Shock ▪ Transducers	18
Defibrillators	18
Pacemakers	18
Possible Combinations with Other Equipment	19
<b>Ultrasound System ▪ Care</b>	<b>20</b>
Daily Checklist	20
Maintenance	21
Repair	21
Siemens Authorized Care	21
Cleaning and Disinfecting	23
Cleaning and Disinfecting the System	23
System Surfaces	24
Cleaning an Air Filter	26
<b>Documentation and Storage Devices ▪ Care</b>	<b>27</b>
<b>Transducers ▪ Care</b>	<b>28</b>
Cleaning and Disinfecting Transducers	29
IPX8 Immersion Levels	31
Non-IPX8 Immersion Levels	32
Approved List of Disinfectants	33
Sterilizing Transducers ▪ VF13-5SP	34
Storage	35
Repair	35
Protective Case	35

<b>Transducer Accessories ■ Care.....</b>	<b>36</b>
Transducer Sheaths.....	36
Storage.....	36
Gel Pad.....	37
Storage.....	37
Needle Guide Bracket Kits.....	37
Storage and Transportation .....	37
Cleaning, Disinfecting, and Sterilizing ■ Needle Guide Bracket Kits .....	38
BE9-4 Disposable Needle Guide Kit .....	38
BE9-4 Stainless Steel Needle Guide Kit .....	38
EC9-4 Disposable Endocavity Needle Guide .....	38
EC9-4 Stainless Steel Endocavity Needle Guide .....	38
6.5EV13 Needle Guide Bracket Kit (EV9-4) .....	39
CH4-1 Needle Guide Bracket Kit (CH5-2) .....	39
Universal Needle Guide, Stainless .....	40
Storage.....	40

# Operating Safety and Environment

















Do not operate the ultrasound imaging system until you fully understand the safety considerations and procedures presented in this manual.





















## [1] Instructions for Use

System Controls Ch 3

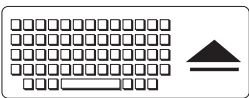

















## System Symbols

The table below is provided for your identification of important symbols located in labels on the ultrasound imaging system and/or transducers.

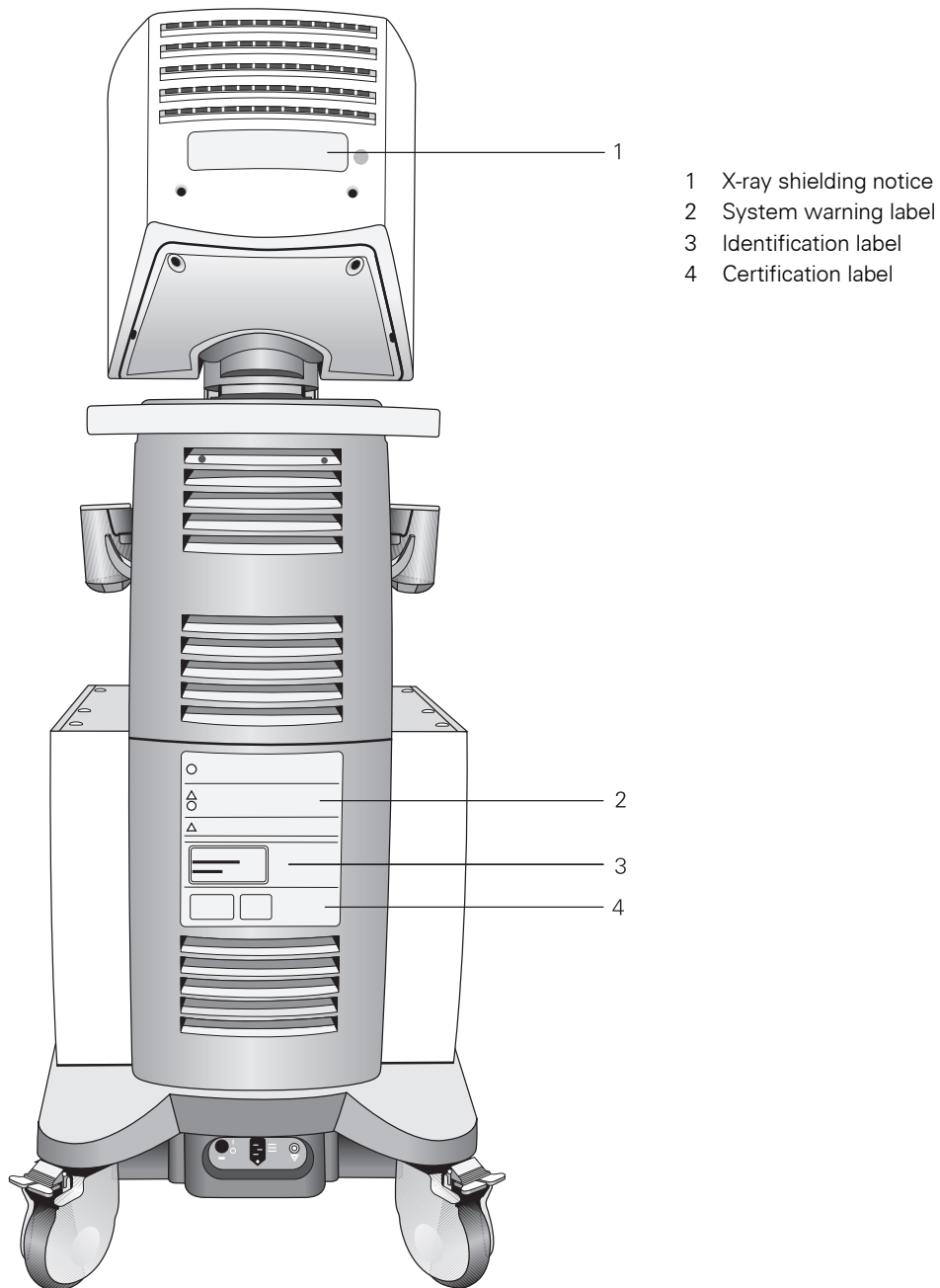
Symbol	Explanation
	Alternating Current
	AC (alternating current) voltage source
	Caution: Risk of electric shock
	Type BF Defibrillator-proof Patient Connection
	Type BF Applied Part
	Type CF Patient Connection
	Consult Operator's Manual
	Equipotential Connection
	Footswitch Connector
	Headphone Connection
	Degauss Control
	Monitor self test
	Monitor Contrast control
	Monitor Brightness control
	Protective Earth Ground
	Signal Earth Ground

Symbol	Explanation
	Signal Input
	Signal Output
	Video Connection (monochrome video signals)
	Video Connection (RGB color video signals)
	Start (of action for equipment)
	Digital Interface, RS-232-C connection
	USB Connection
	Ethernet 10/100BaseT Connection
	Status Indicator for DC Power Good (Green) or Green Indicator Light
	Printer Connection
	Electronic Array Transducer Port (for standard transducers)
	Third Electronic Array Transducer Port (for standard and specialty transducers)
	Mechanical Sector Transducer Port
	Continuous Wave Doppler Transducer Port
	Transducer unlock (left) and lock (right) positions
	Unlocked position
	Locked position
	ECG Socket
	Audio
	Audio Level



Symbol	Explanation
	Keyboard Movement Indicator
	Keyboard Weight Restriction
	ON only for MAINS control
	OFF only for MAINS control
	"ON" only for part of the equipment
	"OFF" only for part of the equipment
<b>IPX8</b>	Protected against the effects of continuous immersion in water
	Do not open. Refer servicing to qualified service personnel.
	Danger: Risk of explosion if used in the presence of flammable anesthetics
	Manufacturer's declaration of product compliance with applicable EEC directive(s) and the European Notified Body
	Manufacturer's declaration of product compliance with applicable EEC directive(s)
	DEMKO-Denmark approval mark.
	UL symbol for listing as recognized components for Canada and United States of America
	Gost-R symbol indicates that this product is certified for conformity to the safety requirements of Russian state standards
<b>IVK</b>	(Installierte Volumen Komponente) Identifier of selected system components or parts for product traceability
	UL Listing Mark
	Bar Code
	9 Volt Battery
	Date of Manufacture symbol with the date below
	Do not dispose of by dumping in garbage. Use a separate collection for electrical and electronic equipment.

## Labels






205 5251-1

Siemens Medical Solutions USA, Inc. - Mt. View, CA 94043

Made in Italy

Model: MCMD01AA V: ~ 100-240 A: 1.2 – 0.6 Hz: 50-60



VIDEO DISPLAY FOR MEDICAL APPLICATION



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.





X-ray emission complies with FDA (DHHS) radiation performance standards, 21 CFR subchapter J applicable at date of manufacture, PVS813VL.

Die in diesem Gerät erzeugte Röntgenstrahlung ist nach RÖV § 5(4) durch die eigensichere Kathodenstrahlröhre ausreichend abgeschirmt, Beschleunigungsspannung maximal 24,5 kV.

 WARNING  DISCONNECT SUPPLY BEFORE SERVICING.

COUPER L'ALIMENTATION AVANT L'ENTRETIEN ET LE DEPANNE.

Example of X-ray shielding notice: "X-ray emission complies with FDA (DHHS) radiation performance standards, 21 CFR subchapter J applicable at date of manufacture."

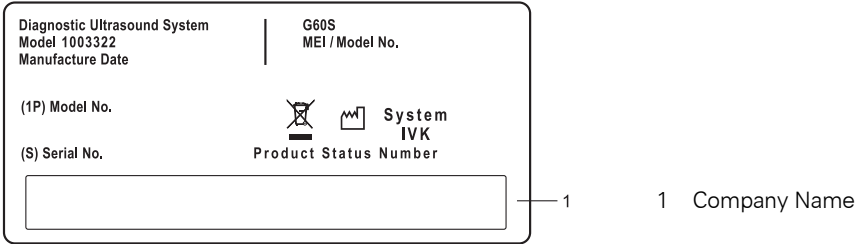
	<p><b>Danger:</b> Risk of explosion if used in the presence of flammable anesthetics.</p> <p><b>Vorsicht:</b> Gerät nicht im Bereich explosiver Gase betreiben.</p> <p><b>Pericolo:</b> Rischio di esplosione. Non usare in presenza di anestetici infiammabili.</p>	<p><b>Danger:</b> Risque d'explosion. Ne pas employer en presence d'anesthésiques inflammables.</p> <p><b>Peligro:</b> Riesgo de explosión. No emplear en presencia de anestésicos inflamables.</p> <p>危険：爆発の危険あり 可燃性麻酔ガスが存在する雰囲気で使用しないこと</p>
 	<p><b>Caution:</b> Risk of electric shock. Do not open. Refer servicing to qualified service personnel.</p> <p><b>Achtung:</b> Risiko eines elektrischen Schlages. Gerät nicht öffnen. Wenden Sie sich an qualifiziertes Service Personal.</p> <p><b>Attenzione:</b> Pericolo di scossa elettrica. Non aprire. Rivolgersi a personale qualificato.</p>	<p><b>Attention:</b> Risque de choc électrique. Ne pas ouvrir. Faire appel au personnel qualifié.</p> <p><b>Precaución:</b> Riesgo de sacudida eléctrica. No abrir. Acudir al personal cualificado del Servicio Técnico.</p> <p>警告：感電の恐れあり キャビネットを開けないこと 電源コードの保護接地端子を必ず接地すること</p>
	<p><b>Note:</b> See operator's manual.</p> <p><b>Hinweis:</b> Bitte in der Gebrauchsanweisung nachsehen.</p> <p><b>Nota:</b> Consultare il manuale dell'utente.</p>	<p><b>Note:</b> Voir manuel d'utilisation</p> <p><b>Nota:</b> Ver instrucciones de uso.</p> <p>注意：取り扱い説明書を読むこと</p>

Caution: Federal (U.S.) law restricts this device to sale by or the order of a physician.

Inst. Opt.	P/N	S/N	AS

S-PL  
ZH631054

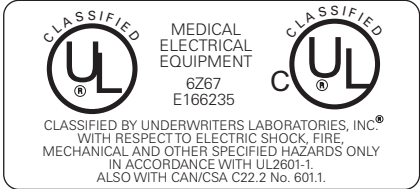
Example of system warning label.



Example of identification label.



Example of product status label.



Example of certification label.



Example of certification label.



Example of certification label (for SONOVISTA systems only).

## Biohazard Considerations

- ⚠ **WARNING:** This equipment is not suitable for intracardiac use or direct cardiac contact.
  
- ⚠ **WARNING:** For neonatal head imaging, Siemens recommends that you exercise special care during neonatal cephalic scanning to avoid possible damage to the posterior region of the eye. The ultrasound energy emitted by the transducer easily penetrates the fontanelles of the infant.
  
- ⚠ **WARNING:** Siemens makes every effort to manufacture safe and effective transducers. You must take all necessary precautions to eliminate the possibility of exposing patients, operators, or third parties to hazardous or infectious materials. These precautions should be considered in the use of any application that may indicate the need for such care, and during endocavity or intraoperative scanning; during biopsy or puncture procedures; or when scanning patients with open wounds.
  
- ⚠ **WARNING:** To eliminate the possibility of exposing patients, operators, or third parties to hazardous or infectious materials, always dispose hazardous or infectious materials according to medical regulations for biohazardous waste.
  
- ⚠ **WARNING:** There have been reports of severe allergic reactions to medical devices containing latex (natural rubber). Health care professionals are advised to identify latex-sensitive patients and to be prepared to treat allergic reactions promptly. For additional information in the U.S.A., refer to FDA Medical Alert MDA91-1.
  
- ⚠ **WARNING:** Ultrasound energy is transmitted more effectively through water than through tissue. When using a standoff device of any kind, for example, a gel pad, the actual mechanical and thermal indices, MI and/or TI, may be higher than indicated in the output display on the system.

### [1] Instructions for Use


Transducer Care      2-28

The assessment of the biological effects of diagnostic ultrasound on humans is a subject of ongoing scientific research. This system, and all diagnostic ultrasound procedures, should be used for valid reasons, for the shortest possible period of time, and at the lowest mechanical and thermal indices necessary to produce clinically acceptable images.

According to the ALARA (As Low As Reasonably Achievable) principles, acoustic output should be set to the ***lowest level required to satisfactorily perform the examination***.

The ultrasound imaging system complies with the standards of the American Institute of Ultrasound in Medicine (AIUM), the National Electrical Manufacturer's Association (NEMA), the guidelines of the United States Food and Drug Administration (FDA), and the guidelines of the International Electrotechnical Commission (IEC) in terms of safety and acoustic output levels. The ultrasound output levels are stated to permit the user to critically evaluate the system settings in the event of new research findings being announced.

## Acoustic Output ▪ Mechanical and Thermal Indices

 **WARNING:** Ultrasound procedures should be used for valid reasons, for the shortest period of time, and at the lowest mechanical/thermal index setting necessary to produce clinically acceptable images.

The ultrasound system incorporates an output display of Mechanical and Thermal Indices to allow you to monitor, and to limit, the amount of ultrasound energy that is transferred to the patient.

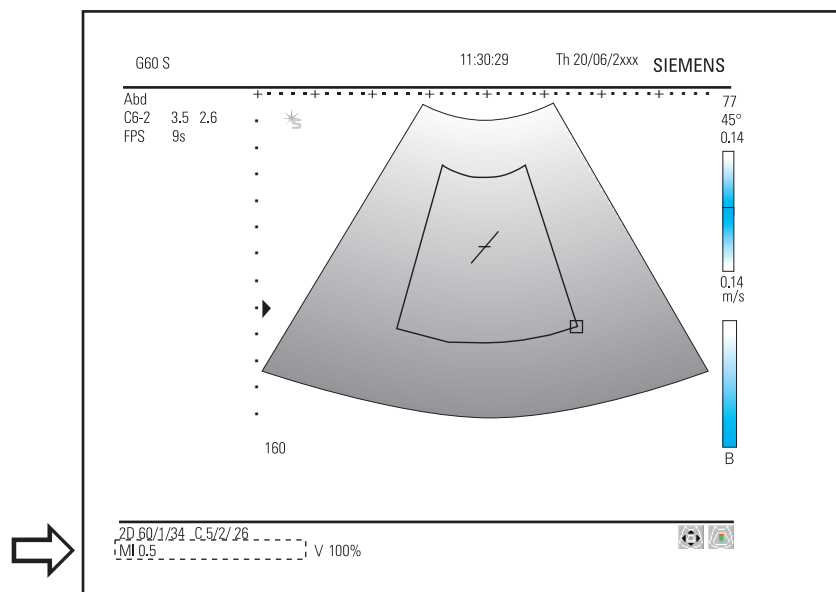
**Note:** For systems distributed in the United States of America, refer to the *Medical Ultrasound Safety* ultrasound education program brochure produced by the AIUM that is included in the *System Reference*.

System Reference	
Acoustic Output	Ch 1

[1] Instructions for Use	
Changing the Transmit Power	2-12
Transmit Power Display	2-13

## Mechanical and Thermal Indices

The system displays the Mechanical and Thermal Indices during real-time imaging, in all imaging modes, when the Mechanical Index or the Thermal Indices are equal to or exceed a value of 0.4.



*Location of mechanical and thermal indices on the image screen.*

### Indices display in the abbreviated form shown below:

- **MI:** Mechanical Index
- **TIB:** Bone Thermal Index (fetal application)
- **TIS:** Soft Tissue Thermal Index
- **TIC:** Cranial Thermal Index

## Transmit Power Control

Adjust the transmit power and the corresponding acoustic pressure delivered through the transducer to the patient by using the designated control on the system. It is the main system function that determines the transmitted intensity of ultrasound for all transducers and imaging modes during real-time imaging, though it is not the only function that affects the mechanical and thermal indices. The range and especially the maximum level of the mechanical and thermal indices differ depending on the transducers. In addition, each diagnostic exam type has preset values for mechanical and thermal indices.

**Note:** Maximum transmit acoustic intensity and the mechanical index for each exam type are limited in accordance with the United States Food and Drug Administration's (FDA) recommendations and guidelines. System default transmit intensity and mechanical index values are always below the FDA recommendations for each exam type. Although some exam types may default to a condition of maximum allowable transmit power, there are other system controls or functions that could raise acoustic output levels.

### To increase the transmit power:

- To increase the transmit power, rotate the **FUNCTION SELECT** control to highlight the **Tx** tab along the bottom of the LCD. Then press **OTx Power↑** on the LCD or rotate the **SELECT-R** control clockwise.

### To decrease the transmit power:

- To decrease the transmit power, rotate the **FUNCTION SELECT** control to highlight the **Tx** tab along the bottom of the LCD. Then press **OTx Power↓** on the LCD or rotate the **SELECT-R** control counterclockwise.

#### [1] Instructions for Use

Functions Affecting  
Acoustic Output 2-14

#### System Reference

System Presets Ch 3

Additional pages of LCD selections can be accessed by pushing the **PAGE** control.



## Transmit Power Display

The transmit power range is from -20 dB to 0 dB. Selecting 0 dB, or 100%, in combination with other system controls or functions generates the maximum acoustic intensity and mechanical index for each transducer, where:

$$I_{SPTA,3} : \leq 720 \text{ mW/cm}^2 \text{ and } MI \leq 1.9$$

Use the system presets to determine whether the power value displays on the image screen in decibels, **dB**, or as a **percentage** of the maximum allowable power.

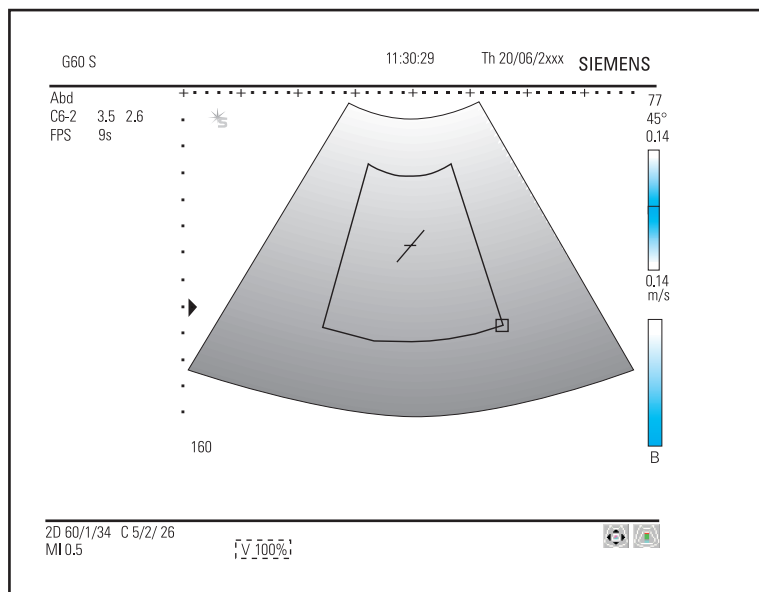
0 dB	-1 dB	-2 dB	-3 dB	-4 dB	-5 dB	-6 dB	
100%	90%	80%	70%	60%	55%	50%	

-7 dB	-8 dB	-9 dB	-10 dB	-12 dB	-14 dB	-16 dB	-20 dB
45%	40%	35%	30%	25%	20%	15%	10%

*Comparison of decibels to percentages.*

When the power level is changed, the system briefly highlights the power value to indicate the change.



*Location of power display on the image screen.*

### System Reference

System Presets Ch 3



### F4


General

► Beep Volume

► Tx Power

Display Format

## Imaging Functions that Change Acoustic Output

 **WARNING:** Observe the real-time display of mechanical and thermal indices (MI/TI) at all times.

In addition to the adjustment of the transmit power, adjustment of the following imaging functions and/or controls may affect the acoustic output:

- Automatic Time-out
- **OTemporal** Color LCD selection
- Color ROI Position and Size; Steering Angle for linear array transducers
- Doppler Gate Position; Steering Angle for linear array transducers
- Doppler PRF
- Color PRF
- Exam Type
- Field of View (Scan Angle); 2D Steering Angle for linear array transducers
- Focus
- Frame Rate (**ORes/Spd** 2D-mode LCD selection)
- Freeze
- Image Depth
- Imaging Mode
- **ODensity** LCD selection in 2D, Color, and Power modes
- Multi-Frequency
- Power On/Off
- System Presets and QuickSets
- THI (using **MULTIHERTZ** control)
- Triplex/Update
- Transducer
- Gel Pad Use

## Transducer Surface Temperature Limits

The following table provides the maximum surface temperature of the transducers compatible with the system.

**Note:** For SONOVISTA systems only:

The 3.5C55S transducer is the equivalent of the C6-2 transducer.

The 3D-ABD transducer is the equivalent of the C6F3 transducer.

The 6.5EV13 transducer is the equivalent of the EV9-4 transducer.

Maximum surface temperatures are in accordance with IEC 60601-2-37.

Transducer	Maximum Temperature	
	TMM	Still Air
CH5-2	≤ 42.3° C	≤ 41.0° C
C6-2	≤ 41.0° C	≤ 41.0° C
C6-3 3D/C6F3	≤ 41.0° C	≤ 41.0° C
C8-5	≤ 41.5° C	≤ 42.3° C
5.0C50+	≤ 41.3° C	≤ 41.0° C
BE9-4	≤ 41.1° C	≤ 41.0° C
EV9-4	≤ 41.0° C	≤ 41.0° C
EC9-4	≤ 41.0° C	≤ 41.0° C
5.0L45	≤ 41.9° C	≤ 43.6° C
7.5L70	≤ 41.9° C	≤ 41.0° C
L10-5	≤ 41.0° C	≤ 41.0° C
VF13-5	≤ 41.0° C	≤ 41.0° C
VF13-5SP	≤ 41.8° C	≤ 44.2° C
P9-4	≤ 41.1° C	≤ 41.0° C
P4-2	≤ 41.4° C	≤ 41.0° C
CW2 <sup>1</sup>	≤ 41.0° C	≤ 41.0° C
CW5 <sup>1</sup>	≤ 41.0° C	≤ 41.0° C

TMM = Tissue Mimicking Material


<sup>1</sup> Not available for SONOVISTA systems


## Electrical Safety


- ⚠ **WARNING:** For systems used in the U.S.A: To ensure grounding reliability, only connect the system to a hospital-grade power outlet.
  
- ⚠ **WARNING:** The AC power connector plug for the ultrasound system is a three-prong grounded plug (in the U.S.A.) and should never be adapted to any two-prong (non-grounded) outlet, either by modifying the plug or by using an adapter. In the U.S.A., proper grounding requires the AC power connector plug to be plugged into a hospital-grade power outlet.
  
- ⚠ **WARNING:** To avoid electrical shock, never modify the ultrasound system's AC power connector plug, as doing so may overload your facility's power circuits. To ensure grounding reliability, connect the system only to an equivalent outlet.
  
- ⚠ **WARNING:** To avoid electrical shock, never use equipment or a MAINS power cord that shows signs of wear or tampering, or that has a ground plug which has been bypassed using an adapter.
  
- ⚠ **WARNING:** Equipment connected to the ultrasound system and in the patient zone must be powered from a medically-isolated power source or must be a medically-isolated device. Equipment powered from a non-isolated source can result in chassis leakage currents exceeding safe levels. Chassis leakage current created by an accessory or device connected to a non-isolated outlet may add to the chassis leakage current of the ultrasound system.
  
- ⚠ **WARNING:** Using an extension cord or multi-socket outlet setup to provide power to the imaging system, or to the system's peripheral devices may compromise the system grounding and cause your system to exceed leakage current limits.
  
- ⚠ **WARNING:** To avoid electrical shock and damage to the ultrasound system, power off and unplug the equipment from the AC power outlet before cleaning and disinfecting.
  
- ⚠ **WARNING:** Do not pour any fluid onto the ultrasound system surfaces, as fluid seepage into the electrical circuitry may cause excessive leakage current or system failure.
  
- ⚠ **WARNING:** To ensure proper grounding and leakage current levels, it is the policy of Siemens to have an authorized Siemens representative or Siemens-approved third party perform all on-board connections of documentation and storage devices to the ultrasound system.

### System Reference

Peripheral Devices	Ch 4
-----------------------	------

 **WARNING:** To maintain the safety and functionality of the ultrasound system, maintenance must be performed every 12 months. Electrical safety tests must also be performed at regular intervals as specified by local safety regulations, or as needed.

 **Caution:** To avoid the possibility of static shock and damage to the system, avoid the use of aerosol spray cleaners on the monitor screens.

 **Caution:** Do not use spray cleaners on the ultrasound system, as this may force cleaning fluid into the system and damage electronic components. It is also possible for the solvent fumes to build up and form flammable gases or damage internal components.

**EMC Note:** Operating the ultrasound system in close proximity to sources of strong electromagnetic fields, such as radio transmitter stations or similar installations may lead to interference visible on the monitor screen. However, the device has been designed and tested to withstand such interference and will not be permanently damaged.

## Level of Protection Against Electrical Shock ■ System

According to EN 60601-1 and IEC 60601-1, the system provides a "Level of Protection Against Electrical Shock" of "Type B."



*The Type B icon is located on the system.*

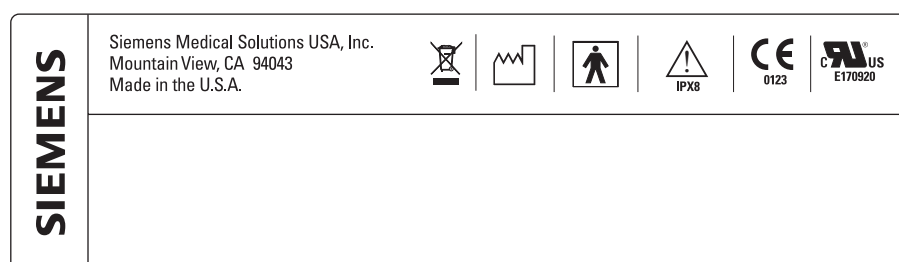
## Level of Protection Against Electrical Shock ■ Transducers

**⚠ WARNING:** Only use Type BF transducers with the ultrasound system to maintain a level of protection against electrical shock.

According to EN 60601-1 and IEC 60601-1, the assemblies for the endocavity transducer and the linear, curved, and phased array transducers provide a "Level of Protection Against Electrical Shock" of "Type BF."



The Type BF icon is located on the transducer label.



Example of a transducer label.

## Defibrillators


**⚠ WARNING:** The ECG function is designed to withstand the effects of defibrillation. However, when possible, disconnect the ECG leads during defibrillation since a malfunction of the safety controls could otherwise result in electrical burns for the patient.

For patient safety, be sure to use defibrillators that do not have grounded patient circuits.

## Pacemakers

**⚠ WARNING:** Pacemakers may be susceptible to the high frequency electrical signal generated by ultrasound equipment. Use precautions when using ultrasound equipment on or near someone with a pacemaker. If there is interference, immediately discontinue the examination and power off the ultrasound system.

## Possible Combinations with Other Equipment

 **WARNING:** Accessory equipment connected to the analog and digital interfaces must be certified according to the respective EN and IEC standards (for example, EN 60950 and IEC 60950 for data processing equipment and EN 60601-1 and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standards EN 60601-1-1 and IEC 60601-1-1. Anyone who connects additional equipment to any of the signal input or signal output ports configures a medical system and is therefore responsible that the system complies with the requirements of the system standards EN 60601-1-1 and IEC 60601-1-1. Siemens can only guarantee the performance and safety of the devices listed in the *System Reference*. If in doubt, consult Siemens service department or your local Siemens representative.

The ultrasound system is capable of supporting up to three on-board documentation devices.

On-board peripheral devices must be installed by an authorized Siemens representative or by a Siemens-approved third party. Devices installed by other people will be at the user's risk and may void the system warranty.

## Ultrasound System ■ Care

It is the responsibility of the user to verify that the ultrasound system is safe for diagnostic operation on a daily basis. Each day, prior to using the system, perform each of the steps in the Daily Checklist.


All exterior parts of the system, including the control panel, keyboard, transducers, and biopsy devices, should be cleaned and/or disinfected as necessary or between uses. Clean each component to remove any surface particles. Disinfect components to kill vegetative organisms and viruses.

The air filter on the ultrasound system must be cleaned regularly to maintain proper system cooling. Remove and check the air filter weekly, and clean as needed.

## Daily Checklist

### Perform the following each day before using the ultrasound system:

- ☐ Visually inspect all transducers. Do not use a transducer which has a cracked, punctured, or discolored casing or a frayed cable.

 **WARNING:** To avoid electrical shock, you must visually inspect a transducer prior to use. Do not use a transducer that has a cracked, punctured, or discolored casing or a frayed cable.

**Discoloration Exception:** The use of the approved disinfectants, Cidex OPA and Gigasept FF, may cause discoloration of transducer housings, including the face of the transducer. You can continue to use a transducer if it is discolored due to the use of these specific disinfectants only.

- ☐ Visually inspect all power cords. Do not turn on the power if a cord is frayed or split, or shows signs of wear.

If your system's power cord is frayed or split, or shows signs of wear, contact your Siemens service representative for power cord replacement.

- ☐ Verify that the trackball, DGC slide controls, and other controls on the control panel and LCD are clean and free from gel or other contaminants.

### Once the system is powered on:


- ☐ Visually check the on-screen displays and lighting.
- ☐ Verify that the monitor displays the current date and time.
- ☐ Verify that the transducer identification and indicated frequency are correct for the active transducer.

### [1] Instructions for Use

Air Filters	2-26
Approved List of Disinfectants	2-33



## Maintenance

 **WARNING:** To maintain the safety and functionality of the ultrasound system, maintenance must be performed every 12 months. Electrical safety tests must also be performed at regular intervals as specified by local safety regulations, or as needed.

## Repair

For questions regarding repair or replacement of any equipment parts on your system, contact your Siemens service representative.

## Siemens Authorized Care

Installers and operators must observe any statutory regulations that govern the installation, operation, inspection, and maintenance of this equipment.

To ensure the safety of patients, operators, and third parties, the equipment must be inspected every 12 months, and the replacement of parts is performed as necessary. This maintenance must be performed by a qualified Siemens authorized representative. It is important to inspect the equipment more frequently if it is operated under extraordinary conditions.


Perform inspections and maintenance at the prescribed intervals to avoid worn and hazardous parts due to wear. Contact the Siemens service department for information regarding the required maintenance. As manufacturers and installers of ultrasound equipment, Siemens cannot assume responsibility for the safety properties, reliability, and/or performance of the equipment, if:

- Installations, extensions, readjustments, modifications, additions, or repairs are carried out by persons not specifically authorized by Siemens.
- Components that affect the safe operation of the system are replaced by parts not authorized by Siemens.
- The electrical installation of the room where the equipment is located does not meet the power and environmental requirements stated in this manual.
- The equipment is not used in accordance with the operating instructions.
- The system is operated by personnel not adequately educated or trained.

Siemens suggests that you request any person who performs maintenance, or repairs, to provide you with a certificate showing:

- The nature and extent of the work performed
- Changes in rated performance
- Changes in working ranges
- Date of service
- Name of person or firm performing the service
- Signature of person performing the service

Technical documentation pertinent to the imaging system is available at an additional charge. However, this does not in any way constitute an authorization to conduct repairs or maintenance. Siemens refuses all responsibility whatsoever for repairs that are performed without the express written consent of the Siemens service department.

 **WARNING:** Accessory equipment connected to the analog and digital interfaces must be certified according to the respective EN and IEC standards (for example, EN 60950 and IEC 60950 for data processing equipment and EN 60601-1 and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standards EN 60601-1-1 and IEC 60601-1-1. Anyone who connects additional equipment to any signal input or signal output ports configures a medical system and is therefore responsible that the system complies with the requirements of the system standards EN 60601-1-1 and IEC 60601-1-1. Siemens can only guarantee the performance and safety of the devices listed in the *System Reference*. If in doubt, consult Siemens service department or your local Siemens representative.

## Cleaning and Disinfecting

You must take all necessary precautions to eliminate the possibility of exposing patients, operators, or third parties to hazardous or infectious materials. Use universal precautions when cleaning and disinfecting. You should treat all portions of the imaging system that come in contact with human blood or other body fluids as if they were known to be infectious.

All exterior parts of the system, including the control panel, transducers, and biopsy devices, should be cleaned and/or disinfected as necessary or between uses. Clean each component to remove any surface particles. Disinfect the components to kill vegetative organisms and viruses.

## Cleaning and Disinfecting the System

- ⚠ **WARNING:** To avoid electric shock and damage to the system, always power off and disconnect the equipment from the AC power source before cleaning and disinfecting.
- ⚠ **WARNING:** Contents of some disinfecting agents are known to be health hazards. Their concentration in the air must not exceed an applicable specified limit. Comply with the manufacturer's instructions when using these agents.
- ⚠ **Caution:** To avoid the possibility of static shock and damage to the ultrasound system, avoid the use of aerosol spray cleaners on the monitor screens.
- ⚠ **Caution:** Do not clean the system with chlorinated or aromatic solvents, acidic or basic solutions, isopropyl alcohol or strong cleaners such as ammoniated products, as these can damage the surface of the system. ***Isopropyl alcohol exception:*** It is acceptable to use isopropyl alcohol when cleaning the trackball assembly only. Use the recommended cleaning procedure.
- ⚠ **Caution:** Do not use spray cleaners on the ultrasound system, or pour fluid onto the system surfaces, as fluid can seep into the system and damage electronic components. It is also possible for the solvent fumes to build up and form flammable gases or damage internal components.
- ⚠ **Caution:** Do not pour any fluid onto the ultrasound system surfaces, as fluid seepage into the electrical circuitry may cause excessive leakage current or system failure.

### [1] Instructions for Use

Trackball Cleaning 2-25

## System Surfaces

The following instructions describe cleaning the surface of the ultrasound system, including the trackball and transducer holder.

### To clean the surface of the ultrasound system:

1. Power off (O) the ultrasound system and unplug the power cord from the power outlet.
2. Use a clean gauze pad or lint-free cloth, lightly moistened with a mild detergent, to wipe the surface of the ultrasound system.

Take particular care to clean the areas near the trackball and the slide controls. Ensure these areas are free of gel and any other visible residue.

Ensure that cleaning solution does not seep into the control panel, LCD, keyboard, or any other openings.

3. After cleaning, use a clean, lint-free cloth to dry the surface.
4. After cleaning, reconnect the ultrasound system power cord into the power outlet.

### To clean the holders for transducers and coupling gel:

1. Remove the holder from the ultrasound system:

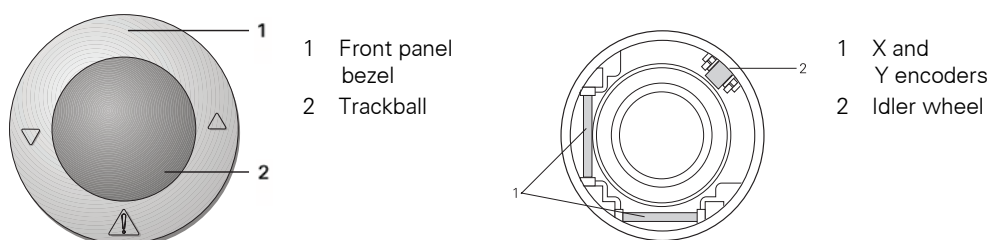
Reach under the holder to locate the tab on the holder. The tab extends below the point of attachment to the ultrasound system. Squeeze the tab towards the holder and pull the holder downward.

2. Clean the holder under running water, using a mild detergent and dry with a lint-free cloth.
3. Reattach the holder to the ultrasound system:

Align the support on the holder directly below the point of attachment on the ultrasound system and firmly push upwards until the holder snaps into place.

#### [1] Instructions for Use

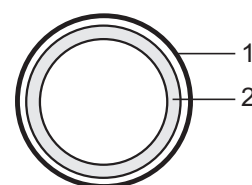
Holder attachment  
and detachment Ch 4



### To clean the trackball:

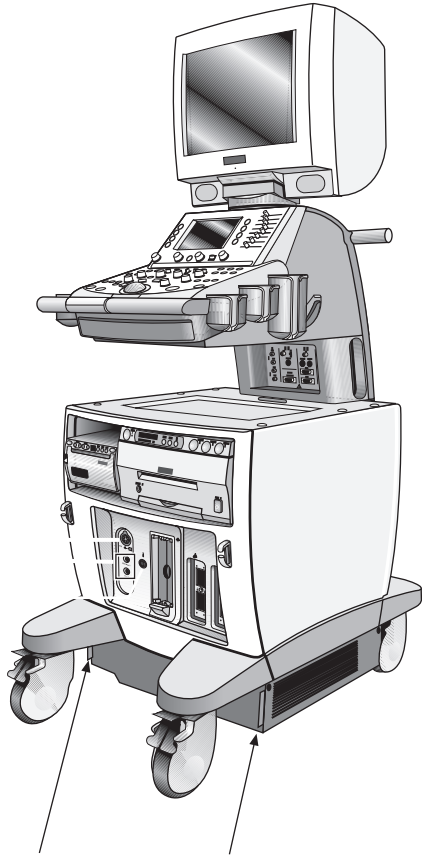
**⚠ Caution:** Do not drop or place foreign objects inside the trackball assembly. This may affect the trackball's operation and damage the system.

1. Remove the front panel bezel by rotating the bezel counterclockwise.
2. Remove the trackball and the teflon ring.
3. Clean the trackball and the teflon ring with a static electricity removal sheet.
4. Clean the inside of the trackball assembly with a static electricity removal sheet or with a cotton swab and isopropyl alcohol, paying particular attention to the **X** and **Y** encoders and the idler wheel.
5. Allow the assembly parts to completely dry before reassembly.
6. Replace the trackball, the teflon ring, and front panel bezel.



## Cleaning an Air Filter

The air filter on the ultrasound system must be cleaned regularly to maintain proper system cooling. Remove and check the air filter weekly, and clean as needed.



*Location of air filter.*

### To remove and clean the air filter:

**⚠ Caution:** Do not scrub, stretch, or bend the filter, or apply heat to the filter, as doing so could damage the filter.

1. Power off and unplug the power cord from the power outlet.
2. Grasp the filter by its tab and pull it out of the slot.
3. Rinse the air filter with running water and allow the filter to completely dry.

To hasten drying, you may gently shake the filter, or blot the filter with a clean, lint-free cloth.











**⚠ Caution:** Do not insert a wet filter as this can damage the system.

5. Slide the air filter back into the ultrasound system.
6. Plug the power cord into the power outlet.

## Documentation and Storage Devices ■ Care

For information on the care of an optional documentation or storage device, please refer to the manufacturer's operating instructions that accompanied the device.

## Transducers ■ Care

-  **WARNING:** Always place a sterile, non-pyrogenic transducer sheath on a transducer used in procedures requiring sterility.
-  **WARNING:** To minimize the risk of cross-contamination and infectious diseases, endocavity and intraoperative transducers must be cleaned and high-level disinfected after each use. A sterile, non-pyrogenic transducer sheath must be in place during procedures requiring sterility.
-  **WARNING:** There have been reports of severe allergic reactions to medical devices containing latex (natural rubber). Health care professionals are advised to identify latex-sensitive patients and to be prepared to treat allergic reactions promptly. For additional information in the U.S.A., refer to FDA Medical Alert MDA91-1.
-  **WARNING:** During neurosurgical procedures, if a transducer becomes contaminated with tissue or fluids of a patient known to have Creutzfeld-Jacob disease, the transducer should be destroyed, as it cannot be sterilized.
-  **WARNING:** When using an endocavity or intraoperative transducer with a CF type applied part, the patient leakage currents may be additive.
-  **WARNING:** The outer surfaces of an endocavity or intraoperative transducer should be checked to ensure there are no unintended rough surfaces, sharp edges, or protrusions that may cause a safety hazard.
-  **Caution:** Transducers are sensitive instruments – irreparable damage may occur if they are dropped, knocked against other objects, cut, or punctured. Do not attempt to repair or alter any part of a transducer.
-  **Caution:** To avoid cable damage, do not roll the system over transducer cables.
-  **Caution:** To avoid damage to the transducer, do not use transducer sheaths containing an oil-based coating or petroleum- or mineral oil-based ultrasound coupling agents. Use only a water-based ultrasound coupling agent.
-  **Caution:** Follow all instructions provided by manufacturers of sterile goods (transducer sheaths) to ensure proper handling, storage, and cycling of all sterile goods.

Take extreme care when handling or storing transducers. They must not be dropped, jarred, or knocked against other objects. Do not allow transducers to come into contact with any sharp-edged or pointed object.



## Cleaning and Disinfecting Transducers

- ⚠ **WARNING:** To avoid electrical shock and damage to the system, disconnect the transducer prior to cleaning or disinfecting.
- ⚠ **WARNING:** Disinfectants and cleaning methods listed are recommended by Siemens for compatibility with product materials, not for biological effectiveness. Refer to disinfectant label instructions for guidance on disinfection efficacy and appropriate clinical uses.
- ⚠ **Caution:** Do not sterilize transducers using hot steam, cold gas, or Ethylene Oxide (ETO) methods. Before applying any other methods which might be recommended by manufacturers of sterilization equipment, please contact your Siemens representative.
- ⚠ **Caution:** To avoid damage to the transducer, observe the immersion levels indicated for each transducer type. Do not immerse or allow the cable or connector of a transducer to become wet.
- ⚠ **Caution:** The transducers have been designed and tested to be able to withstand high-level disinfection as recommended by the manufacturer of the disinfectant product. Carefully follow the disinfectant manufacturer's instructions. Do not immerse for more than one hour.
- ⚠ **Caution:** Do not use abrasive cleaning agents, organic solvents such as benzene, isopropyl alcohol, or phenol-based substances, or cleaning agents containing organic solvents to clean or disinfect transducers. These substances can damage the transducers.
- ⚠ **Caution:** Do not use a spray cleaner on a transducer, as this may force cleaning fluid inside the housing and damage the transducer.

All transducers should be cleaned and disinfected prior to their use on each patient. Endocavity and intraoperative transducers require high-level disinfection prior to use.

### [1] Instructions for Use

High-level disinfection	2-30
Immersion Levels	2-31

**To clean and disinfect a transducer:**

1. Disconnect the transducer from the system.
2. Moisten a clean gauze pad with water and wipe the transducer to remove any gel or particles remaining on the transducer. If water is not effective, you may use an enzymatic cleaner.
3. Carefully wipe the entire transducer, including the cable and connector.
4. To disinfect the transducer, take care to keep the cable strain relief and connector of the transducer dry while immersing the transducer in an approved disinfectant to the level indicated in the following illustration.
5. Carefully follow the disinfectant manufacturer's instructions.
6. After cleaning or disinfecting, use a clean cloth to dry the transducer.

**To high-level disinfect a transducer:**

1. Disconnect the transducer from the system.
2. Thoroughly clean, rinse, and dry the transducer.
3. Take care to keep the cable strain relief and connector of the transducer dry while immersing the transducer in an approved disinfectant to the level indicated in the following illustration.
4. Carefully follow the manufacturer's instructions for high-level disinfection.
5. After high-level disinfecting, use a clean cloth to dry the transducer.

## IPX8 Immersion Levels

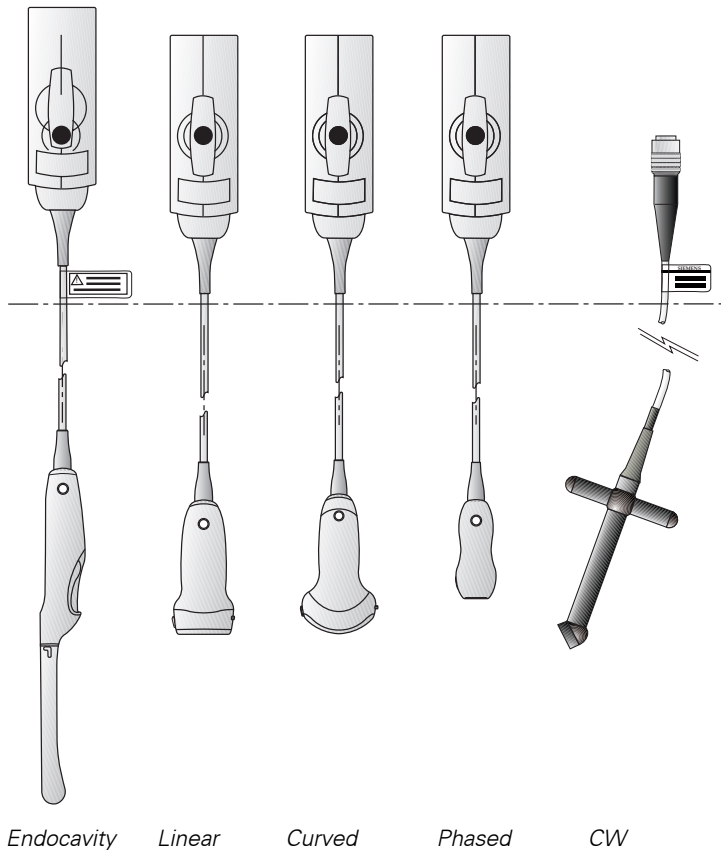
**⚠ Caution:** To avoid damage to the transducer, observe the immersion levels indicated for each transducer type. Transducers with the protection level IPX8 are indicated by the presence of the "IPX8" symbol on the connector of the transducer. If a transducer does not have the "IPX8" symbol on the connector of the transducer, then observe the immersion levels provided in the illustration for Non-IPX8 transducers.

Transducers meet Ingress Protection level IPX8 of EN 60539 and IEC 60539 to the depth of the immersion line shown in the illustration only for transducers with the "IPX8" symbol on the connector of the transducer.



*Example of transducer labels with IPX8 symbol.*

Endocavity transducers exceed minimum Ingress Protection level IPX7 of IEC 60601-2-18 to the depth of the immersion line shown in the illustration.



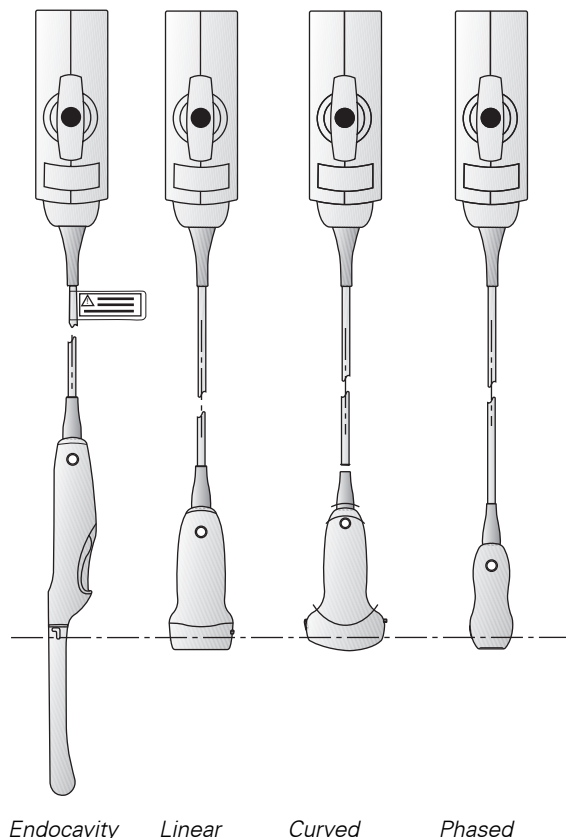
*Endocavity    Linear    Curved    Phased    CW*

**⚠ Caution:** Do not immerse the label located on the cable of the CW transducer.

**Note:** Intraoperative transducers are immersible up to the strain relief on the connector.

## Non-IPX8 Immersion Levels

**⚠ Caution:** To avoid damage to the transducer, observe the immersion levels indicated for each transducer type. Transducers without the protection level IPX8 do not have the "IPX8" symbol on the connector of the transducer. If a transducer does not have the "IPX8" symbol on the connector of the transducer, then observe the Non-IPX8 Immersion Level illustration.



**Note:** Non-IPX8 transducers meet Ingress Protection level IPX7 to the depth of the immersion line shown in the above illustration.

## Approved List of Disinfectants

The following matrix provides a list of approved disinfectants for all transducers.

**Note:** For SONOVISTA systems only:

The 3.5C55S transducer is the equivalent of the C6-2 transducer.

The 3D-ABD transducer is the equivalent of the C6F3 transducer.

The 6.5EV13 transducer is the equivalent of the EV9-4 transducer.

**Note:** The approved disinfectants, Cidex OPA and Gigasept FF, may discolor transducer housings, including the face of the transducer. There is no associated degradation of imaging performance or transducer reliability.

	<b>Cidex</b>	<b>Cidex Plus</b>	<b>Cidex OPA</b>	<b>Milton</b>	<b>Virkon</b>	<b>Gigasept FF</b>
CH5-2	✓	✓	✓	✓	NC	✓
C6-2	✓	✓	✓	✓	✓	✓
C6-3 3D/C6F3	✓	✓	✓	NC	✓	✓
C8-5	✓	NA	NA	NA	NA	NA
5.0C50+	✓	✓	✓	✓	✓	✓
BE9-4	✓	✓	✓	✓	✓	NC
EV9-4	✓	✓	✓	✓	✓	✓
EC9-4	✓	✓	✓	✓	✓	✓
5.0L45	✓	✓	✓	✓	✓	✓
7.5L70	✓	✓	✓	✓	✓	✓
L10-5	✓	✓	✓	✓	✓	✓
VF13-5	✓	✓	✓	✓	✓	✓
VF13-5SP	✓	✓	✓	✓	✓	✓
P9-4	✓	✓	✓	✓	✓	✓
P4-2	✓	✓	✓	✓	✓	✓
CW2 <sup>2</sup>	✓	✓	✓	✓	✓	✓
CW5 <sup>1</sup>	✓	✓	✓	✓	✓	✓


✓ = compatible

NC = not compatible

NA = not applicable (not tested)

<sup>2</sup> Not available for SONOVISTA systems

## Sterilizing Transducers ▪ VF13-5SP

 **Caution:** The transducers have been designed and tested to be able to withstand sterilization as recommended by the manufacturer of the sterilization system. Carefully follow the sterilization manufacturer's instructions.

The STERRAD® sterilization system, a hydrogen peroxide gas plasma sterilization system, is approved for use with the listed intraoperative transducer(s).

- VF13-5SP

### To sterilize a transducer with the STERRAD system:

**Note:** This procedure applies to the VF13-5SP transducer only.

1. Disconnect the transducer from the system.
2. Thoroughly clean, rinse, and dry the transducer.
3. Carefully follow the manufacturer's instructions for sterilization.

## Storage

Store transducers in a clean and dry environment. Extreme temperatures or humidity may damage a transducer.

## Repair

Do not attempt to repair or alter any part of the transducer. Contact your service representative at Siemens immediately if a transducer appears to be damaged or malfunctions in any way.


## Protective Case

Due to the mechanical sensitivity of transducers, Siemens recommends that you always use the transducer case when you ship a transducer or transport it from one place of examination to another. The case is specially designed to protect the sensitive parts of the transducer. Be sure that all parts of the transducer are properly placed inside the case before you close the lid.

### [1] Instructions for Use

System Care	2-20
Temperatures	Ch 6


## Transducer Accessories ■ Care


 **WARNING:** Ensure the accessories for a transducer are properly cleaned, sterilized or disinfected as appropriate before each use to avoid possible patient contamination.


Instructions for care are provided for the following accessories for transducers:

- Transducer Sheaths
- Gel pads
- Needle Guide Bracket Kits

## Transducer Sheaths


 **WARNING:** There have been reports of severe allergic reactions to medical devices containing latex (natural rubber). Health care professionals are advised to identify latex-sensitive patients and to be prepared to treat allergic reactions promptly. For additional information in the U.S.A., refer to FDA Medical Alert MDA91-1.

 **WARNING:** To minimize the risk of cross-contamination and infectious diseases, endocavity transducers must be cleaned and high-level disinfected after each use. A sterile, non-pyrogenic transducer sheath must be in place during procedures requiring sterility.

 **Caution:** Siemens recommends that you follow all instructions provided by manufacturers of sterile goods (transducer sheaths) to ensure proper handling, storage, and cycling of all sterile goods.

Using a disposable latex transducer sheath on a transducer reduces the possibility of cross-contamination. Always use a protective transducer sheath for endocavity exams, and when scanning an open wound or an area where the skin is not intact.

## Storage

 **Caution:** Do not store transducer sheaths in direct sunlight, as ultraviolet damage can result.

Latex products have a limited shelf life, and should be stored in a cool, dry, dark place with an ambient temperature between –5°C and +40°C and up to 80% relative humidity at +40°C. Before use, examine these products for any material flaws. Some packaging may list an expiration date. Any product showing flaws, or whose expiration date has passed, should not be used.




## Gel Pad

Before use, examine the gel pad for any material flaws. Thinning, bulging, or brittleness of the material indicates damage. Any product showing flaws should not be used.

## Storage

Do not store gel pads below 5°C nor above 57°C. Gel pads have a limited shelf life. Before use, examine these products for any material flaws. Some packaging may list an expiration date. Any product showing flaws, or whose expiration date has passed, should not be used.

## Needle Guide Bracket Kits

 **WARNING:** If a needle guide becomes contaminated with tissue or fluids of a patient known to have Creutzfeld-Jacob disease, then the needle guide should be destroyed. Sterilization is not effective against Creutzfeld-Jacob contamination.

Needle guide bracket kits are available for biopsy and puncture procedures for specific transducers.

### [2] Instructions for Use


Compatible Transducers	Ch C1
---------------------------	-------

## Storage and Transportation

Always clean and sterilize or high-level disinfect components used in a needle puncture or biopsy procedure after each use.


## **Cleaning, Disinfecting, and Sterilizing ■ Needle Guide Bracket Kits**

### **BE9-4 Disposable Needle Guide Kit**

 **WARNING:** The needle guide is packaged sterile and is a single-use item. Do not use if the packaging indicates signs of tampering or if the expiration date has passed.


The disposable endocavity needle guide is a single-use item. Refer to the in-box instructions for disposal instructions.

### **BE9-4 Stainless Steel Needle Guide Kit**

 **WARNING:** Needle Guide Bracket kits are packaged non-sterile. Sterilize these products prior to their first use.


The stainless steel endocavity needle guide is a reusable item. Refer to the in-box instructions for attachment and care procedures, including cleaning and sterilization.

### **EC9-4 Disposable Endocavity Needle Guide**

 **WARNING:** The needle guide is packaged sterile and is a single-use item. Do not use if the packaging indicates signs of tampering or if the expiration date has passed.


The disposable endocavity needle guide is a single-use item. Refer to the in-box instructions for disposal instructions.

### **EC9-4 Stainless Steel Endocavity Needle Guide**

 **WARNING:** Needle Guide Bracket kits are packaged non-sterile. Sterilize these products prior to their first use.

The stainless steel endocavity needle guide is a reusable item. Refer to the in-box instructions for attachment and care procedures, including cleaning and sterilization.

## 6.5EV13 Needle Guide Bracket Kit (EV9-4)

 **WARNING:** Needle Guide Bracket kits are packaged non-sterile. Sterilize these products prior to their first use.

### To clean:


1. Rinse the guide under water, and then scrub the inside of the guide with a brush.
2. Visually inspect the guide to make sure all debris is removed.

### To sterilize:

1. Prior to sterilization, clean the needle guide.
2. Sterilize holders and needle guides using steam at a temperature of 121°C to 123°C for an exposure time of 15 to 30 minutes. This is a gravity-displacement steam sterilization method.


## CH4-1 Needle Guide Bracket Kit (CH5-2)

### Disposable Needle Guide

 **WARNING:** The needle guide is packaged sterile and is a single-use item. Do not use if the packaging indicates signs of tampering or if the expiration date has passed.


The needle guide for use with the CH4-1 bracket kit is a single-use item. Refer to the in-box instructions for disposal instructions.

### Reusable Bracket

 **WARNING:** Needle Guide Bracket kits are packaged non-sterile. High-level disinfect these products prior to their first use.

Refer to the in-box instructions for attachment and care procedures, including cleaning and high-level disinfecting procedures for the bracket.

## Universal Needle Guide, Stainless

 **WARNING:** Needle Guide Bracket kits are packaged non-sterile. Sterilize these products prior to their first use. Refer to the sterilization procedures for the Universal Needle Guide in the following pages.

Prior to sterilization, clean the universal needle guide bracket and insert(s) using an enzymatic cleaner.

### To clean:

1. Rinse the bracket and insert(s) with water.
2. Soak the bracket and insert(s) in an enzymatic cleaner.  
Carefully follow the manufacturer's instructions.
3. Rinse the bracket and insert(s) with water to remove any debris and remaining cleaner.

### To sterilize:

- Sterilize the bracket and needle guide insert(s) using a wrapped, gravity-displacement steam sterilization at a temperature of 121°C to 123°C for an exposure time of 15 to 30 minutes.

## Storage

Always clean and sterilize components used in a needle puncture or biopsy procedure after each use.

## 3 System Controls

---

<b>Control Panel .....</b>	<b>5</b>
Control Panel Lighting .....	6
Control Panel Audio Signal .....	6
Trackball .....	6
Select .....	7
Caliper .....	8
Freeze.....	8
Patient Information Keys .....	9
New Patient .....	9
Patient Data.....	9
Exam .....	9
Selection and Entry Keys.....	9
ESC .....	9
Set.....	9
2D-Mode and M-Mode Imaging Controls .....	10
2D.....	10
Split .....	10
Dual/Select .....	11
4B .....	11
M.....	12
L/R.....	12
Rotate.....	12
3D/4D .....	12
Doppler and Color Flow Operation Keys.....	13
D.....	13
Triplex.....	13
Update.....	14
Angle .....	14
CW .....	14
C.....	15
Power.....	15
Steer.....	15
Invert .....	16
Baseline.....	16
Gate.....	16
PRF .....	16

Image Parameter Controls.....	17
DGC.....	17
Transducer .....	17
MultiHertz .....	17
Depth/Zoom .....	18
Focus.....	18
Pictograms and Annotation .....	19
Text .....	19
Pictogram .....	19
Documentation Controls.....	20
Print/Store 1 .....	20
Print/Store 2 .....	20
Digital Store.....	20
Video I/O .....	20
VCR .....	21
Review .....	21
Special Function Controls.....	21
CINE.....	21
Crescendo .....	21
<b>Alphanumeric Keyboard.....</b>	<b>22</b>
Special Characters.....	23
Function Keys.....	24
F1 – New Patient.....	24
F2 – Report.....	24
F3 – Patient Data.....	24
F4 – Preset Menu.....	24
F5 – Exam .....	24
F6 .....	24
F7 .....	24
F8 – QuickSet.....	25
F9 – Home Set .....	25
F10 – Delete Line .....	25
F11 – Delete Text.....	25
F12 – Text .....	25
F13 – Biopsy.....	25

Other Alphanumeric Keys.....	26
Arrows.....	26
Alt.....	26
Backspace .....	26
Caps Lock.....	26
Ctrl.....	26
Del.....	26
End.....	26
Enter.....	27
ESC .....	27
Home .....	27
PgDn (Page Down) .....	27
PgUp (Page Up).....	27
Shift.....	27
Space Bar .....	27
Tab .....	27
Ins, Fn, PrtSc/SysRq, Scroll Lock, and Pause Break .....	27
<b>Footswitch .....</b>	<b>28</b>
<b>LCD Panel .....</b>	<b>29</b>
LCD and LCD Keys.....	30
LCD Keys .....	31
Tabs.....	31
LCD Controls .....	32
Volume .....	32
LCD Control.....	32
Select-L .....	32
Select-R.....	33
Page .....	33
Function Select .....	33
Transmit Power LCD Selections.....	34
2D-Mode LCD Selections .....	35
M-Mode LCD Selections .....	37
Doppler LCD Selections .....	38
Color Flow LCD Selections.....	39
Power Mode LCD Selections .....	41
CINE LCD Selections.....	42
ECG LCD Selections.....	43
LCD Selections for All Measurements and Calculations.....	43
LCD Selections for 2D-Mode Measurements and Calculations.....	44
LCD Selections for M-Mode Measurements and Calculations .....	46
LCD Selections for Doppler Measurements and Calculations .....	47
VCR LCD Selections.....	48
Biopsy/Puncture LCD Selections .....	49
SieScape Panoramic Imaging Option LCD Selections .....	49

<b>Selections Used in the Stress Echo Feature .....</b>	<b>50</b>
Select Protocol to Load Dialog Box .....	50
Protocol Window .....	50
Stress Echo Screen .....	51
Toolbar Buttons ▪ Stress Echo .....	51
Select Mode Selections ▪ Stress Echo.....	53
Review Mode Selections ▪ Stress Echo.....	53
Wall Motion Scoring Mode Selections ▪ Stress Echo.....	54
LV Mode Selections ▪ Stress Echo.....	54
Maintenance Dialog Box ▪ Stress Echo .....	55
Protocol Editor Dialog Box ▪ Stress Echo .....	57
<b>Selections in DIMAQ-IP.....</b>	<b>58</b>
LCD ▪ DIMAQ-IP.....	58
Study Screen ▪ DIMAQ-IP .....	59
Image Screen ▪ DIMAQ-IP.....	61
DIMAQ Utility .....	62
<b>Selections for <i>fourSight</i> 4D Imaging .....</b>	<b>63</b>
LCD Selections for <i>fourSight</i> 4D Imaging .....	63
Volume Cine LCD Selections.....	65
Layout LCD Selections .....	66
Save LCD Selections .....	67
Palette LCD Selections.....	67
Auto View LCD Selections .....	68
QuickSet LCD Selections .....	69
On-screen Selections for <i>fourSight</i> 4D Imaging .....	70
Menu Selections .....	70
<i>fourSight</i> QuickSet Dialog Box .....	73
Palette Dialog Box .....	73
Volume Toolbar Icon Selections .....	75
MPR Toolbar Icon Selections .....	78
<b>DICOM Screen Selections .....</b>	<b>80</b>
Study Screen .....	80
Image Screen .....	80
DICOM Screen .....	81
Printer Layout Pages .....	81
Print and Store Queues .....	82

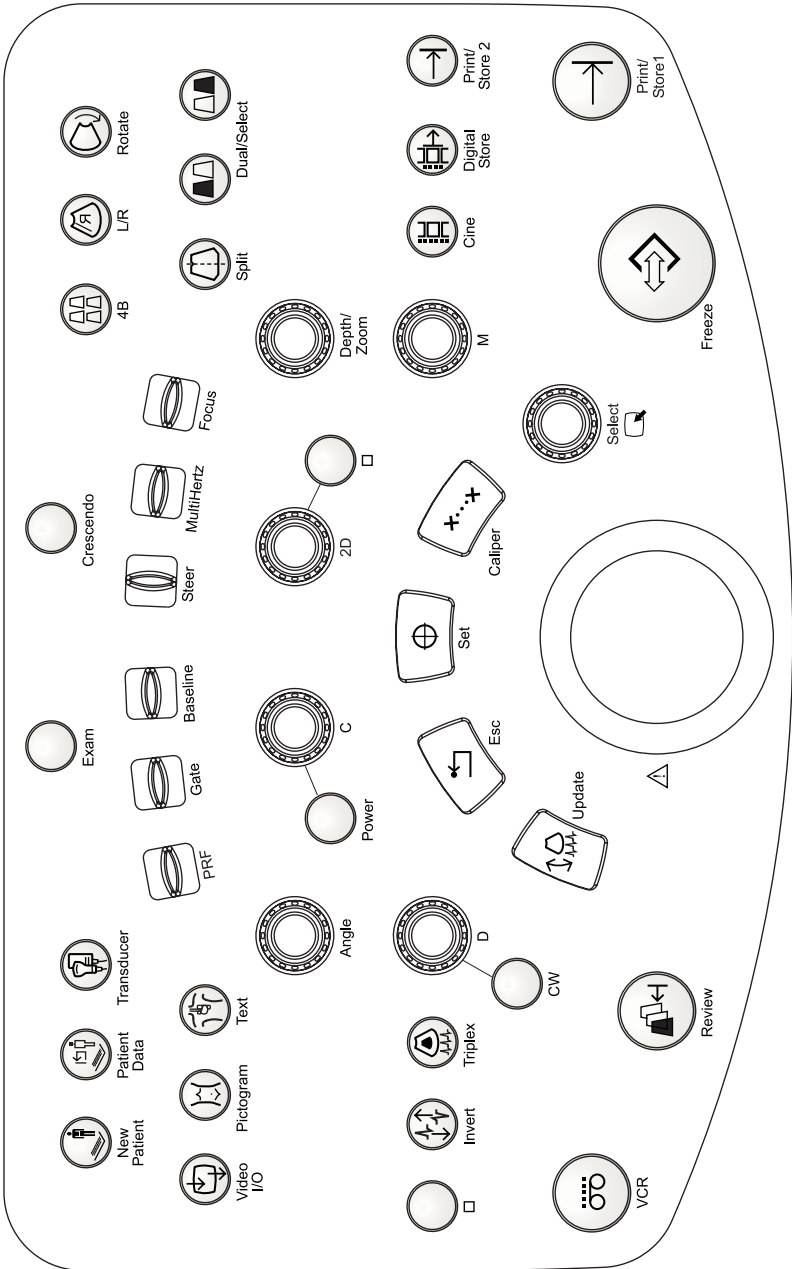


# Control Panel

The controls for all imaging modes, parameters, documentation, and LCD selections are designed to promote quick learning and recognition of the controls and functions. The ultrasound imaging system has a combination of keys, rotary knobs, push and rotate controls, push controls, and function keys. A trackball provides direct access to calipers, menu items, and other imaging functions. These keys and controls are logically arranged to require a minimum number of hand and eye movements.

Language overlays for the control panel are available. The locations and functions of the keys and controls are not impacted by the overlay.

[1] Instructions for Use	
Keyboard	3-22



Example of the control panel on the ultrasound imaging system.

**Note:** On SONOVISTA systems, the location of the **ESC** and **UPDATE** keys are transposed. The function of the keys is not impacted by their location.

## Control Panel Lighting

When the imaging system is in use, all controls on the main control panel are back-lit. Use the system presets to select from among three levels of back-lit illumination. The system increases the lighting intensity of most active controls to show you, at a glance, which functions are active. A lamp located under the front handle provides additional lighting for the retractable keyboard.

## Control Panel Audio Signal

Use the system presets to deactivate or adjust the volume of the beep.

## Trackball

The trackball is the main interactive tool used to position image graphics and text, and make selections from on-screen menus. You can use the trackball in conjunction with the keys and controls located on the control panel, including LCD selections.

When a particular function is active, the system assigns the trackball to a specific task. The active function currently under trackball control is represented by a green-highlighted: on-screen overlay, graphical object, or icon on the lower left of the screen.



**F4**

Display

► Panel LED  
Brightness

General

► Beep  
► Beep Volume



*Trackball.*



*Trackball pointer.*

## Select

A dual-function control that activates one function when the control is pressed and another function when the control is rotated. When several functions are active, you can assign control of the trackball to any of the active functions by pressing the **SELECT** control.

During mixed-mode imaging, you can press the **SELECT** control to reassign the trackball from controlling a function for one mode (for example, 2D FOV) to controlling a function for another mode (for example, the Doppler gate).

During the measurement function, you can press the **SELECT** control to reassign the trackball from the edit function (for measured values or measured data) to controlling the paging function of the Measurement menu. Rotating the control when a trace measurement or drawing in a patient report is active causes the system to delete the line, one dot at a time.

During the text annotation function, you can press the **SELECT** control to activate the on-screen pointer when the image is frozen.



### To assign the trackball:

1. Press the **SELECT** control.  
The active function currently under trackball control is represented by a green-highlighted: on-screen overlay, graphical object, or icon on the lower left of the screen.
2. To cycle through the available functions, continue to press the **SELECT** control.
3. Rotate the **SELECT** control within a function to access its corresponding settings, pages, or values.

# Caliper

Activates the Measurement function.

When you press the **CALIPER** key, the LCD displays measurement selections appropriate for the imaging mode and exam type. The system also places the first marker in a *caliper* set (set of measurement markers) in the image area.

To access a Measurement Label menu directly, press the **CALIPER** key a second time.

The Measurement function can generate a patient report for exam types with a report.

Use the system presets to automatically activate the Measurement function each time you press the **FREEZE** key.

# Freeze

Freezes the image, sweep, or spectrum on the screen. If an image or sweep is already frozen, pressing the **FREEZE** key restores real-time imaging.

Use the system presets to change the response of the **FREEZE** key.

**Cine** activates the CINE function.

**Caliper** activates the measurement function.

**Text** activates the annotation function.

**Picto** activates the Pictogram function.

**None** activates the freeze function only.

**Pedal 1** on the footswitch is programmed with the same functionality as the **FREEZE** key.

During 4D imaging, pressing the **FREEZE** key completes volume acquisition for review and editing of volumes in the CINE buffer.

Use the system presets to assign functions to this key during 4D imaging.



Caliper

## System Reference

System Presets Ch 3



### F4

- Default Settings
  - Automatic Freeze Response
- Default Settings
  - 4D Preference



Freeze

## Patient Information Keys

Use the patient information keys to input and edit patient data.

### New Patient

Displays the new Patient Data entry form. The **NEW PATIENT** key on the control panel functions the same as the **F1** key on the keyboard.



**New Patient**

### Patient Data

Displays the Patient Data form currently in use. You can view or edit the form. The **PATIENT DATA** key on the control panel functions the same as the **F3** key on the keyboard.



**Patient Data**

### Exam

Displays a list of available system-defined exam types and user-defined QuickSets. The **EXAM** key on the control panel functions the same as the **F5** key on the keyboard.



**Exam**

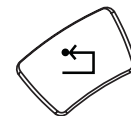
## Selection and Entry Keys

The **ESC** and **SET** keys are located in close proximity to the trackball and provide additional functionality to the trackball and **SELECT** control for interacting with on-screen information and objects.

### ESC

Exits the currently displayed mode, function, or page and reactivates the previous mode, function, or page.

Pressing the **ESC** key, while in the Measurement function, exits the function and erases all measurements.



**Esc**

### Set

The **SET** key confirms the selection of a specific function or command. For example, you can use it to anchor calipers, select a menu item or image graphic, cycle through certain menu settings, include a measurement value in a patient report, or delete a measurement from the worksheet.

When used with the trackball, the function of the **SET** key is similar to a mouse-mode click in the system's Windows®-based technology.

During 4D imaging, pressing the **SET** key toggles the rotate function with the pan function on the volume and free cursor.



**Set**

## 2D-Mode and M-Mode Imaging Controls

Use the imaging controls to activate an operating mode, change the image orientation, or modify the sweep display.

### 2D

A dual-function control that activates one function when the control is pressed and another function when the control is rotated.

Pressing the **2D** control activates 2D-mode for grayscale imaging. If a mixed mode or imaging function is active, pressing **2D** causes the system to exit the mode or function and return to 2D-mode.

Rotating the **2D** control changes the overall gain for 2D-mode. Rotating the **2D** control clockwise increases the gain; a counterclockwise rotation decreases the gain.

The range for gain settings is from 0 dB to 40 dB. When combined with the DGC controls, a gain range of -15 dB to 55 dB is possible.

<b>B:</b>	<b>55/</b>	<b>1/</b>	<b>32</b>
-----------	------------	-----------	-----------

*Gain (dB) is indicated by the shaded value.*

The gain value displays as the third number in the Image Parameter area for 2D-mode, at the bottom of the image screen.

During 4D imaging, pressing the **2D** control exits *fourSight* 4D imaging.



### Split

Creates side-by-side images from one 2D-mode image. The two images are simultaneously frozen or real-time.

Certain post-processing imaging parameters can be changed in the right image, allowing you to compare the effects of different image settings on an anatomical structure.

During 4D imaging, pressing the **SPLIT** key displays the A + 3D (dual) format.



## Dual/Select

Activates Dual-mode, which displays two separately acquired images, side-by-side.

The **DUAL/SELECT** control consists of a set of two keys. The left key displays an image on the left side of the screen. The right key displays an image on the right side of the screen. Use either key to initiate Dual-mode.

Only one image can be active at any one time. The active image is indicated by the lighting intensity of the selected key and by the brightened active image indicator that displays on the image screen.

The **DUAL/SELECT** control can be used to toggle the active image. Pressing the left key activates the left image and freezes the right image. Pressing the right key activates the right image and freezes the left image.

**Note:** The system displays a full screen image when the key for the active image is pressed. The system restores the side-by-side display when this key is pressed again.

Most imaging parameters can be changed independently.



*Active Image Indicator.*

## 4B

Activates 4B-mode which displays four separately acquired 2D-mode images.

Only one image is active at a time. The active image is indicated by the brightened active image indicator.

Pressing the **4B** key displays the first image on the upper left side of the screen. Pressing the **FREEZE** key freezes the active image and displays the next image. A total of four images can be displayed. Press the **4B** key repeatedly to cycle through and activate images.



Most imaging parameters can be changed independently.

During 4D imaging, pressing the **4B** key displays the 4B four-quadrant display format.

M

A dual-function control that activates one function when the control is pressed and another function when the control is rotated.

Pressing the **M** control displays an M-mode cursor in a 2D image. You can then roll the trackball to place the cursor in the area of interest. Pressing **M** a second time displays 2D/M-mode.

Rotating the **M** control changes the overall gain M-mode. Rotating the **M** control clockwise increases the gain, and counterclockwise rotation decreases the gain. The range for gain settings is from 0 dB to 40 dB. When combined with the DGC controls, a gain range of -15 dB to 55 dB is possible.

M:	35/	2/	29
----	-----	----	----

Gain (dB) is indicated by the shaded value.

The gain value displays as the third number in the Image Parameter area for M-mode, at the bottom of the image screen.

During 4D imaging (for completed acquisitions only), pressing the **M** control cycles through axes of rotation. Rotating the **M** control rotates the volume data set around the selected axis.



L/R

Changes the scan direction of the active transducer. The image can be acquired from right-to-left or left-to-right.

The location of the active image indicator defines the direction of scanning.

During 4D imaging, pressing the **L/R** key flips the volume vertically (up/down).



Rotate

Changes the vertical orientation of the image on the screen. The **ROTATE** key causes the image to rotate 90° clockwise with each press of the key.

During 4D imaging, pressing the **ROTATE** key rotates the volume 90° clockwise.



3D/4D

Activates the *four*Sight 4D imaging option.

Use the system presets to assign functions to this key during 4D imaging.



System Reference	
System Presets	Ch 3
<hr/>	
F4	
<hr/>	
Default Settings	
► 4D Preference	



# Doppler and Color Flow Operation Keys

Use these controls and keys to operate the Doppler and Color Flow functions.

## D

A dual-function control that activates one function when the control is pressed and another function when the control is rotated.

Pressing the **D** control displays a Doppler cursor and Doppler gate for placement in the 2D-mode image. Depending on the system presets, pressing the **D** control the first time can also initiate display of the Doppler spectrum.

For pulsed Doppler, pressing the **D** control a second time causes the system to display 2D-mode with Doppler and to transmit an audible Doppler signal.

**Doppler Search mode** enables transmission of an audible Doppler signal the first time you press the **D** control. Pressing the **D** control a second time changes the display to 2D-mode with Doppler. Use the system presets to activate Doppler Search mode.

Rotating the **D** control clockwise increases the gain; counterclockwise rotation decreases the gain. The range for gain settings is from 30 dB to 60 dB.

The gain value for the Doppler image displays as the last number in the Image Parameter area, at the bottom of the screen.

D:	100/	4.8/	45
----	------	------	----

Doppler gain (dB) is indicated by the shaded value.

## Triplex

Allows mixed-mode imaging to display simultaneously, in real-time.

An example of mixed mode imaging is 2D-mode with color and Doppler.

### System Reference

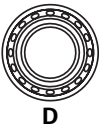
System Presets Ch 3



#### F4

Default Settings

- Bypass M/D
- Cursor Display
- Doppler Search Mode



D



Triplex

## Update

Toggles a real-time display with a frozen display during mixed-mode imaging.

For example, if a 2D-mode image is frozen while the Doppler spectrum is in real-time, pressing the **UPDATE** key causes the system to display the 2D-mode image in real-time while freezing the spectrum.

During 4D imaging (for completed acquisitions only), pressing the **UPDATE** key cycles through sub toolbar icons related to the indicated toolbar icon on the toolbar.



**Update**

## Angle

A dual-function control that activates one function when the control is pressed and another function when the control is rotated.

Rotating the **ANGLE** control positions the Flow Angle indicator in relationship to the Doppler cursor.

Pressing the **ANGLE** control cycles through the active settings for the Flow Angle indicator. The value of the angle displays in the upper right of the screen.

During 4D imaging, rotating the **ANGLE** control changes the angle of the VOI (volume of interest); pressing the **ANGLE** control resets the VOI position. When the VOI is off and the **Move Toolbar** icon is selected, pressing the **ANGLE** control toggles the vertical toolbar position with the horizontal toolbar position.



**Angle**

## CW

Activates the steerable continuous wave (SCW) Doppler function for phased array transducers.

Activates the auxiliary continuous wave Doppler function for the continuous wave (pencil) transducer.



**CW**

C

A dual-function control that activates one function when the control is pressed and another function when the control is rotated.

Pressing the **C** control initiates Color Flow imaging.

Rotating the **C** control clockwise increases the gain; counterclockwise rotation decreases the gain. The range for gain settings is from 0 dB to 30 dB.

**Note:** In Power mode, rotating the **C** control changes the overall gain for Power mode.

C:	2/	4/	25
----	----	----	----

Color or power gain (dB) is indicated by the shaded value.

The gain value for the color image displays as the last number in the Image Parameter area, at the bottom of the screen.



Power

Activates Power mode and displays the Power mode LCD selections.

During Power mode, rotating the **C** control clockwise increases the Power gain; counterclockwise rotation decreases the Power gain. The range for gain settings is from 0 dB to 30 dB.

The gain value for Power mode displays as the last number in the Image Parameter area, at the bottom of the screen.



Steer

For linear array transducers, steers the 2D image, the Doppler cursor, or the Color window. The amount of steering is dependent on the type of transducer.

Pushing the **STEER** control to the left positions the 2D image, the Doppler cursor, or the color window to the left. Pushing the **STEER** control to the right positions the 2D image, the Doppler cursor, or the color window to the right.



## Invert

During pulsed wave (PW) and steerable continuous wave (SCW) Doppler, the **INVERT** key flips the Doppler spectrum vertically on the baseline and inverts the Doppler audio.

During Color Flow, the **INVERT** key vertically flips the color bar.



**Invert**

## Baseline

During Doppler, the **BASELINE** control shifts the spectral baseline position and/or shifts the color baseline.

During Color Flow, the **BASELINE** control shifts the baseline in the color bar.

Pushing the **BASELINE** control up shifts the baseline up, and pushing the control down shifts the baseline down.



**Baseline**

## Gate

Adjusts the size of the pulsed Doppler gate. Gate sizes are determined by transmit frequency.

Pushing the **GATE** control up increases gate size, and pushing the control down decreases the gate size.

The gate size displays as the second number in the Image Parameter area, at the bottom of the screen.



**Gate**

## PRF

Adjusts the scale factor of the Pulsed Repetition Frequency (PRF) in Doppler, the velocity range in Color Flow imaging, and the frequency range in Power mode.

Pushing the **PRF** control up increases or shifts the scale factor up, and pushing the control down shifts the scale down.



**PRF**

# Image Parameter Controls

Use the image parameter controls to acquire and view an image.

## DGC

Increases or decreases the received gain for the depth of view. The receiver gain range is depth-dependent for the active transducer frequency.

The system can display a graphic representing the DGC curve on the image screen.

Use the system presets to select the length of time that the DGC graphic displays on the image screen. The **2D** control also affects system gain.

## Transducer

Displays a listing on the LCD of all transducers connected to the system. The name of the active transducer is highlighted on the LCD and is displayed in the upper left of the image screen. Use the LCD keys to select a transducer.

## MultiHertz

Changes the transmit frequency of an active multi-frequency transducer in all modes.

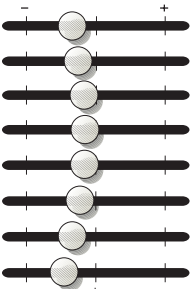
During real-time imaging in 2D-mode, **MULTIHERTZ** changes the transmit frequency for 2D-mode imaging. When using Color or Doppler, **MULTIHERTZ** affects the transmit frequency for Color or Doppler.

Push the **MULTIHERTZ** control to cycle through the available frequencies. Pushing the control up increases the frequency, and pushing the control down decreases the frequency.



F4

- Display
  - DGC Curve
- Display
- General
  - DGC Invert with Image Invert



DGC Control.



Transducer



MultiHertz

## Depth/Zoom

A dual-function control that activates one function when the control is rotated and another function when the control is pressed and then rotated.

Assign the direction of rotation to the **DEPTH/ZOOM** control for increasing the depth or increasing the magnification factor.

Rotating the **DEPTH/ZOOM** control changes the imaging depth.

The depth scale displays in millimeters (mm), and the current depth setting displays on the lower left of the image screen.

Pressing **DEPTH/ZOOM** activates a zoom window in the image, initiating the magnification process. Zoom is available in real-time or when the image is frozen. Zoom is also available for a frozen, zoomed image.

**Note:** The zoom window appears highlighted in green when active.

Rolling the trackball positions the zoom window over the region of interest (ROI). Rotating **DEPTH/ZOOM** adjusts the size of the window.

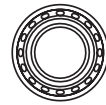
Pressing **DEPTH/ZOOM** again magnifies the selection. To exit zoom, press the **2D** control or press **DEPTH/ZOOM** again.

During 4D imaging, pressing the **DEPTH/ZOOM** control toggles volume magnification with MPR magnification. Rotating the **DEPTH/ZOOM** control adjusts the level of magnification.



**F4**

Customize Keys  
► Zoom/Depth  
Direction



**Depth/Zoom**

## Focus

The **FOCUS** control positions the transmit focal zones in the image. One, two, or four focal zone markers can be positioned at the same time. Mechanical sector transducers have a fixed focus.

**Note:** When two or four focal zones are used, a reduction in frame rate occurs. The amount of reduction depends on the depth of view and the transducer in use.

Push the **FOCUS** control up or down to position the focal zone markers that represent the focal zone locations.



**Focus**

### One (1)

You can position the marker throughout the field of view.

### Two (2)

The spacing between the two focal zones adjusts automatically.

### Four (4)

The **FOCUS** control adjusts the relative position of the focal zone markers within the field of view. The spacing between the focal zones adjusts automatically.

# Pictograms and Annotation

Use the pictogram and annotation controls to display text and graphics depicting anatomical structures on-screen.

## Text

Allows access to tools for positioning, entering, and editing text on the image screen. You can enter text from the keyboard or from a set of descriptive anatomical terms on the LCD.

Pressing the **TEXT** key displays the terms assigned to a specific exam type on the LCD and causes the system to place the text cursor on the image screen. The system places the cursor at the end of the last entered text.

To reposition the text cursor, roll the trackball. Either use the keyboard to enter text or select a term from the LCD. Access additional pages of terms with the **PAGE** control. Press the **ESC** key to remove text displayed on the screen.

Press the **ESC** key, the **SELECT-L** control, or the **SELECT-R** control to remove text displayed on the screen.

Use the system presets to customize the text assigned to an exam type.

Use the system presets to automatically activate the Text function each time you press the **FREEZE** key.

## Pictogram

**Pictograms** are on-screen anatomical graphics that indicate the anatomy under evaluation and the orientation of the transducer. Pictograms can also be included in patient reports for some exam types.

Pressing the **PICTOGRAM** key displays the pictograms assigned to a specific exam type on the LCD.

Use the system presets to customize the pictograms assigned to an exam type.

To select a pictogram, press the associated LCD key. Access additional pictograms with the **PAGE** control. Press the **ESC** key to remove the pictogram displayed on the screen.

Some pictograms contain a transducer marker. Use the **SELECT** control to rotate the transducer marker. To reposition the marker, roll the trackball.

Use the system presets to automatically activate the Pictogram function each time you press the **FREEZE** key.

### [2] Instructions for Use

Annotations	Ch A1
Pictograms	Ch A1



#### F4

- General
  - Text Character Size
  - Arrow Size
- Default Settings
  - Pictogram List
  - Text Annotation
  - Automatic Freeze Response



**Pictogram**

## Documentation Controls

Use the documentation controls to access recording devices for printing, storing, or retrieving images and imaging parameters.

Use the system presets to assign a function to the available documentation controls.



**F4**

Customize Keys

### Print/Store 1

Activates the assigned function, such as printing or storing the displayed image or report.

### Print/Store 2

Activates the assigned function, such as printing or storing the displayed image or report.

### Digital Store

Activates the assigned function, such as storing the displayed image or report or saving a clip.

### Video I/O

Displays a video signal that originates from an outside source, such as a VCR, on the system monitor. Pressing **VIDEO I/O** causes the system to display selections for controlling the video recording device on the LCD.

Use the system presets to select the **Composite** option for **Video Input Source** to enable the **VIDEO I/O** key to toggle the two video input sources.



**Print/Store 1**



**Print/Store 2**



**Digital Store**



**Video I/O**



VCR

Toggles the record function with the pause or stop function for a video recording device.

Use the system presets to configure this control for either a record/pause function or a record/stop function.



Review


Accesses the DIMAQ-IP feature to play back clips and view images and reports, either during a patient examination or from saved studies.

**Note:** With the DIMAQ-IP feature, you can also save clips, images, reports, and patient data to the system's hard disk or to removable disk media and you can manage the saved studies.



Special Function Controls



Keys or controls marked with the symbol  are reserved for future use.

CINE

Activates the CINE function and displays CINE LCD selections.


Use the system presets to automatically activate the CINE function each time you press the **FREEZE** key.

During 4D imaging (for completed acquisitions only), pressing the **CINE** key activates or deactivates Volume Cine for review of volumes in the CINE buffer.

System Reference

Video Recording	Ch 4
DIMAQ-IP	Ch 5



 **F4**

Default Settings
► Automatic Freeze Response

Crescendo

Crescendo activates and displays LCD selections for the features of the Crescendo™ Multi-Dimensional Image Processor hardware and software. An example of a Crescendo-based feature includes the Stress Echo option.



## Alphanumeric Keyboard

Use the alphanumeric keyboard for entering patient data, selecting an exam type, annotating clinical images, and configuring the system presets. The retractable keyboard is located underneath the control panel.

The keyboard is arranged like a standard computer keyboard. A description of the function keys and other special keys follows.



*Example of the System Keyboard.*

## Special Characters

The system supports some language's special characters through the use of a combination of keys on the keyboard.



The **ALT** key located on the left or right side of the keyboard accesses the special characters located on the upper right of a key.



The **SHIFT** key located on the left or right side of the keyboard accesses the special characters located on the upper left of a key.

German		French	
Character	Key Combination	Character	Key Combination
Ä	ALT p	Ç	ALT n
ä	ALT -	ç	ALT j
ö	ALT 0 (zero)	à	ALT z
Ü	ALT [	è	ALT x
ü	ALT =	é	ALT s
ß	ALT '	ù	ALT b
Spanish		Italian	
Character	Key Combination	Character	Key Combination
í	ALT 1	à	ALT z
¿	ALT /	è	ALT x
Ñ	ALT l	é	ALT s
ñ	ALT 9	ì	ALT c
á	ALT a	ò	ALT v
é	ALT s	ù	ALT b
í	ALT d		
ó	ALT f		
ú	ALT g		
Scandinavian		Other	
Character	Key Combination	Character	Key Combination
Æ	ALT m	Œ	ALT u
æ	ALT k	œ	ALT 8
Ø	ALT . (period)	α	ALT q
ø	ALT ;	β	ALT w
Å	ALT ,	μ	ALT e
å	ALT l	θ	ALT r

## Function Keys

The **F** keys located in a row across the top of the alphanumeric keyboard are called **function keys**. These keys are used to access patient data and reports, select an exam type, configure presets, define a QuickSet, activate a biopsy (puncture) procedure, and activate the annotation function.

### F1 – New Patient

Displays the first page of a new Patient Data entry form. The **F1** key has the same function as the **NEW PATIENT** key on the control panel.

A dark gray rectangular button with the text "F1" in white.

### F2 – Report

Displays the patient report if one is available for the current exam type. You can view, edit, or print the report.

A dark gray rectangular button with the text "F2" in white.

### F3 – Patient Data

Displays the Patient Data form currently in use. You can view or edit the page. The **F3** key has the same function as the **PATIENT DATA** key on the control panel.

A dark gray rectangular button with the text "F3" in white.

### F4 – Preset Menu

Displays the first page of the **Preset Main Menu**. Use the system presets to modify and customize the system, including general settings, QuickSets, image annotation, and calculation settings.

You can use the **F4** key to exit the system presets.

A dark gray rectangular button with the text "F4" in white.

### F5 – Exam

Displays a list of available system-defined exam types and user-defined QuickSets.

A dark gray rectangular button with the text "F5" in white.

### F6

Displays operating instructions.

A dark gray rectangular button with the text "F6" in white.

### F7

Reserved for future use.

A dark gray rectangular button with the text "F7" in white.

F8 – QuickSet

Accesses the screen for saving, deleting, and overwriting QuickSets (a configuration of imaging settings for a specific transducer and exam type).



F9 – Home Set

Sets the default location of the text cursor. After pressing the **TEXT** key on the control panel or **F12** key, roll the trackball to place the text cursor on the image screen in the desired location and then press the **F9** key. When the **HOME** key on the keyboard is pressed, the system places the text cursor in the position defined with the **F9** key.



F10 – Delete Line

Deletes lines of text, beginning with the most recent entry.



F11 – Delete Text

Deletes all text annotation displayed in the image area. Pressing the **F11** key does not delete pictograms.



F12 – Text

Activates the Annotation function and places the text cursor on the image screen.



When accessing the Annotation function after powering on the system, the **F12** key places the text cursor in the location defined with the **F9** key. The **F12** key has the same function as the **TEXT** key on the control panel.

You can use the **F12** key to exit the Annotation function.

F13 – Biopsy

Displays biopsy/puncture guidelines on the image screen for specific transducers and provides LCD selections for selecting and modifying the guidelines.

Use the system presets to enable the Biopsy function to automatically activate when an exam type is selected.

You can use the **F13** key to exit the Biopsy function.

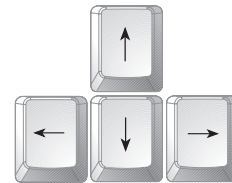


<b>F4</b>
Default Settings
► Biopsy

## Other Alphanumeric Keys

### Arrows

Repositions the text cursor in the direction shown on the arrow key.



### Alt

Accesses special characters on the upper right of the keys located on the keyboard.



### Backspace

Deletes one character at a time from right to left during text entry.

Deletes lines of completed text, one at a time.



### Caps Lock

Locks all keyboard letter keys in upper case.



### Ctrl

Accesses special characters.

The key combination **CTRL+P** provides a shortcut to hide or display patient information on the image screen.



### Del

Deletes one character at a time from left to right during text entry.

Deletes all completed text entries. The **DEL** key has the same function as the **F11** key on the keyboard.



### End

Repositions text cursor to the end of the active text entry.



## Enter

Accepts entered data.

Moves the cursor to the beginning of the next line of text or entry field.



## ESC

Performs same functions as the **ESC** key on the control panel.



## Home

Places the text cursor in the Home position (as defined with the **F9** key) when the Annotation function is active.



## PgDn (Page Down)

Reserved for future use.



## PgUp (Page Up)

Reserved for future use.



## Shift

Accesses the upper-case letters and the character on the upper left of a key located on the keyboard.



## Space Bar

Inserts a blank space.

## Tab

Moves the cursor to the beginning of the next available entry field in the **Patient Data** form or a patient report.



## Ins, Fn, PrtSc/SysRq, Scroll Lock, and Pause Break

Reserved for future use.

## Footswitch

Use the optional footswitch as an alternative to operating keys on the control panel. Pedal 1 is assigned to the Freeze/Unfreeze function; pressing this pedal is equivalent to using the **FREEZE** key on the control panel. Use the system presets to assign Pedal 2 to one of the following functions:

- Print to a black and white printer.
- Print to a color printer.
- Save images and patient reports to the storage location.
- Save clips to the storage destination.



### F4

Customize Keys

► Pedal 2 Function

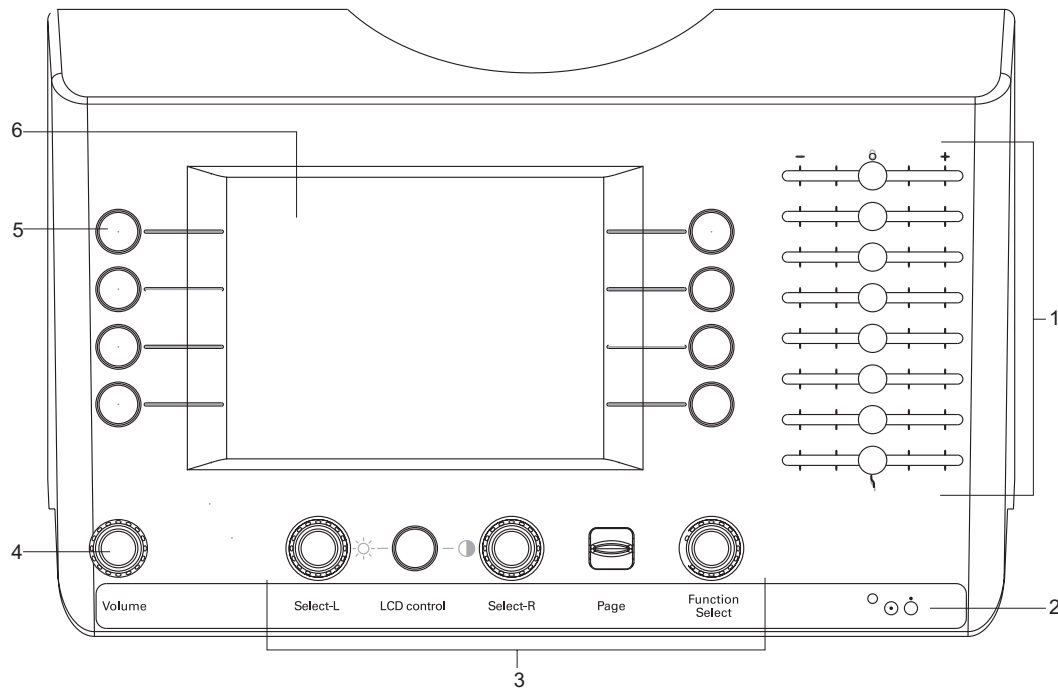


## LCD Panel

The Liquid Crystal Display (LCD) panel contains the LCD, LCD keys, DGC slider controls, and controls used in conjunction with the LCD and other functions.

### [1] Instructions for Use

DGC slider controls 3-17



### LCD Panel.

- 1 DGC slider controls
- 2 System power (partial) ON/OFF (⊙/⊘) indicator
- 3 LCD panel controls
- 4 Speaker volume control
- 5 LCD keys
- 6 LCD

## LCD and LCD Keys

The LCD lists options and functions for image optimization, transducer selection, measurements, image annotation, biopsy and puncture guidelines, CINE, image review, image storage, and tabs for the active mode(s) and functions.

Selections are arranged as eight cells on the LCD, in two columns of four rows each. Each cell contains one or two options, or a single function with its current setting highlighted.

Each of the eight cells on the LCD has a corresponding key that is used to select options and adjust settings.

Tabs along the bottom of the LCD identify currently active modes and functions. A highlighted tab identifies LCD selections currently displayed.

## LCD Keys

Press one of these eight keys to select the adjacent item in the LCD and to highlight the setting for the item. If the LCD contains two items (such as during the Annotation function), press the LCD key to toggle the selections.

### Changing a Setting of an LCD Selection

If multiple settings for a highlighted selection are available, rotate the **SELECT-L** control or **SELECT-R** control to change a setting.

For example, during 2D imaging, the LCD includes a selection for dynamic range (**DR**). To adjust the dynamic range, you must first press the key adjacent to the selection. The system highlights the setting for the dynamic range. Then, you have two choices to adjust the setting:

- Repeatedly press the **ODR** key, or
- Rotate the **SELECT-L** control.

#### To change a setting of an LCD selection located on the right side of the LCD:

- Repeatedly press the selected LCD control, or rotate the **SELECT-R** control.

#### To change a setting of an LCD selection located on the left side of the LCD:

- Repeatedly press the selected LCD control, or rotate the **SELECT-L** control.

## Tabs

When you activate a mode or function, the system displays LCD selections for that mode or function. The system also assigns a tab for the selections at the bottom of the LCD. To access LCD selections for an active mode or function, rotate the **FUNCTION SELECT** control. The system highlights the active tab.

## LCD Controls

The LCD controls include an audio control, LCD brightness and contrast adjustments, and LCD selection tools.

### Volume

Rotating the control clockwise increases the speaker volume; counterclockwise rotation decreases the volume.



**Volume**

### LCD Control

Assigns the **SELECT-L** control to adjusting the LCD contrast and the **SELECT-R** control to adjusting the LCD brightness.

Press the **LCD CONTROL** key again to assign the **SELECT-L** and **SELECT-R** controls to the LCD settings for selections.



**LCD Control**

### Select-L

A dual-function control that activates one function when the control is pressed and another function when the control is rotated.

When the **LCD CONTROL** key is pressed on, you can rotate **SELECT-L** clockwise to increase the LCD contrast or counterclockwise to decrease the contrast.



**Select-L**

When the **LCD CONTROL** is pressed off, press the **SELECT-L** control to highlight one of the LCD selections in the left column. Then rotate **SELECT-L** to increase (clockwise) or decrease (counterclockwise) the highlighted LCD setting.

During text annotation, rotate **SELECT-L** to increase (clockwise) or decrease (counterclockwise) the size of the text or arrow annotation.

## Select-R

A dual-function control that activates one function when the control is pressed and another function when the control is rotated.

When the **LCD CONTROL** key is pressed on, you can rotate **SELECT-R** clockwise to increase the LCD brightness or counterclockwise to decrease the brightness.

When the **LCD CONTROL** key is pressed off, press the **SELECT-R** control to highlight one of the LCD selections in the right column. Then rotate **SELECT-R** to increase (clockwise) or decrease (counterclockwise) the highlighted setting.

During text annotation, rotate **SELECT-R** to increase (clockwise) or decrease (counterclockwise) the size of the text or arrow annotation.



**Select-R**

## Page

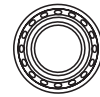
Accesses multiple LCD pages within a mode or function. Push the **PAGE** control to cycle through the available pages. The upper right corner of the LCD shows current page number/total number of pages available.



**Page**

## Function Select

Selects a tab at the bottom of the LCD to activate the associated LCD selections.



**Function  
Select**

## Transmit Power LCD Selections

You can access the transmit power LCD selections by rotating the **FUNCTION SELECT** control on the LCD panel to highlight the **Tx** tab on the LCD.

Rotate the **SELECT-R** control clockwise to select **OTx Power↑** and increase a setting or counterclockwise to select **OTx Power↓** and decrease a setting.

**Note:** Pressing the **SELECT-R** control toggles the **OTx Power↑** LCD selection with the **OTx Power↓** LCD selection.

LCD Selection	Description	Settings
<b>OTx Power↑</b>	Increases the transmit power level and the corresponding acoustic pressure delivered through the transducer to the patient.	0 dB to –20 dB or 100% to 10%
<b>OTx Power↓</b>	Decreases the transmit power level and the corresponding acoustic pressure delivered through the transducer to the patient.	0 dB to –20 dB or 100% to 10%

## 2D-Mode LCD Selections

You can access the 2D-mode LCD selections by rotating the **FUNCTION SELECT** control on the LCD panel to highlight the **2D** tab on the LCD.

LCD Selection	Description	Settings
<b>ODR</b> (Dynamic Range)	Controls the overall contrast resolution of 2D-mode images.	35 dB to 70 dB in 1 dB increments
<b>OPersistence</b>	Creates a visible smoothing effect by maintaining more lines of image data for each frame of imaging when the setting is increased.	0, 1, 2, 3, 4, or 5
<b>OEdge Enhance</b>	Distinguishes the edges of a structure.	0, 1, 2, or 3
<b>OGray Map</b>	Selects a gray (processing) map.	L, B, G, C, S, D, A, E,
<b>OFocus</b>	For all curved, linear, or phased array transducers, selects the number of focal zones.  Use the <b>FOCUS</b> control on the control panel to position the markers.	1, 2, or 4
<b>OFOV/POS</b>	Resizes and repositions the field of view using the trackball.	POS, FOV, Off
<b>OA-mode</b>	Activates or deactivates A-mode.	On, Off
<b>OReset Map</b>	Resets the current Gray Map curve back to the original factory position.	—
<b>OTGO Refresh</b>	Re-activates TGO (Tissue Grayscale Optimization).	—
<b>O TGO Gain</b>	Specifies an offset value for preferred image brightness with TGO during an examination (for the current exam type and transducer). The selected value represents the increments of gain adjustment to be added to or subtracted from the default setting for the optimized gain.	-40 to 40 in increments of 1
<b>OTGO</b>	Automatically optimizes the overall field of view (FOV) image brightness uniformity by changing the DGC, overall gain, and lateral gain.	On, Off
<b>OModify Map</b> (Processing)	Allows changes to the shape of the current Gray Map with the exception of Map <b>L</b> .	—

LCD Selection	Description	Settings
<b>OCOLOR</b>	Colorizes the 2D-mode image.	Off, Sepia, Mag, Cool, Bow
<b>OReject</b>	Increases or decreases the level of gray shades eliminated from the image.	0 to 64 in increments of 2
<b>OOffset</b>	Enables horizontal and vertical scrolling of the image using the trackball.	On, Off
<b>OPSP</b>	Doubles the frame rate. Independent of the parallel processing in Color mode.	On, Off
<b>OSynAps</b>	This selection is available for phased array transducers. Extends the focal zone. This selection is available for curved and linear array transducers.	On, Off
<b>ODensity</b>	Increases or decreases the acoustic scan line density of a 2D image.	Std (Standard) or Hi (High)
<b>ORes/Speed</b>	Increases image resolution by decreasing frame rate.	Std/Dtl/Far
<b>OClip Capture</b>	Displays the <b>Clip capture presets</b> screen.  <b>Note:</b> You can also display the <b>Clip capture presets</b> screen by pressing the <b>F4</b> key on the keyboard to display the <b>Preset Main Menu</b> and then selecting <b>Clip Capture</b> on the left of the screen.	—



## M-Mode LCD Selections

When M-mode is active, you can access the related LCD selections by rotating the **FUNCTION SELECT** control on the LCD panel to highlight the **M** tab on the LCD.

LCD Selection	Description	Settings
<b>ODR</b> (Dynamic Range)	Controls the overall contrast resolution of M-mode sweep.	35 dB to 70 dB in 5 dB increments
<b>OEdge Enhance</b>	Edge Enhancement. Distinguishes the edges of a structure.	0, 1, 2, or 3
<b>OReject</b>	Increases or decreases the level of gray shades eliminated from a sweep.	0 to 64 in increments of 1
<b>OGray Map</b>	Selects an M-mode gray map.	L, B, G, C, S, D, A, E,
<b>OFull M</b>	Displays a full-screen M sweep.	On, Off
<b>OColor</b>	Colorizes the M-mode sweep.	Off, Sepia, Mag, Cool, or Bow
<b>OSweep Speed</b>	Adjusts the scrolling speed of the M-mode sweep.	2sec, 4sec, 8sec, or 16sec

## Doppler LCD Selections

When Doppler is active, you can access the related LCD selections by rotating the **FUNCTION SELECT** control on the LCD panel to highlight the **D** tab on the LCD.

LCD Selection	Description	Settings
<b>OFull D</b>	Activates a full-screen format for Doppler spectrum.	On, Off
<b>OFilter</b>	Sets the cutoff frequency for the Wall Filter.	0, 1, 2, 3, 4, 5 or 6
<b>OColor</b>	Colorizes a Doppler spectrum.	Off, Sepia, Mag, Cool, or Bow
<b>OSweep Speed</b>	Adjusts the scrolling speed of the Doppler spectrum.	2sec, 4sec, 8sec, or 16sec
<b>OTrace Mode</b>	During pulsed Doppler, displays a blue graphical trace that tracks Mode velocities or frequencies of the spectrum.	Full (trace above and below baseline), Up (trace above baseline), or Off
<b>OTrace Mean</b>	During pulsed Doppler, displays a yellow graphical trace that tracks Mean velocities or frequencies of the spectrum.	Full (trace above and below baseline), Up (trace above baseline), or Off
<b>OTrace Min</b>	During pulsed Doppler, displays a red graphical trace that tracks Minimum velocities or frequencies of the spectrum.	Full (trace above and below baseline), Up (trace above baseline), or Off
<b>OTrace Max</b>	During pulsed Doppler, displays a white graphical trace that tracks Maximum velocities or frequencies of the spectrum.	Full (trace above and below baseline), Up (trace above baseline), or Off
<b>OHPRF</b>	Activates a High Pulse Repetition Frequency (PRF). (Pulsed Doppler)	On, Off
<b>O2D Update</b>	Selects how many seconds the 2D-mode image is updated during the image refresh of the Update function with the Doppler spectrum.	Off, 1sec, 2sec, 3sec, or 4sec
<b>OReject</b>	Decreases or increases the level of gray shades eliminated from the image.	0 to 64 in increments of 2
<b>OAudio Balance</b>	Shifts the Doppler volume balance to the right or left.	-8 to 8 in increments of 1
<b>OPre Process</b>	Selects a curve for enhancing the Doppler spectrum.	0, 1, 2, or 3
<b>OPost Process</b>	Changes the gray scale of the spectrum.	0, 1, 2, 3, 4, 5, 6, or 7
<b>OScale</b>	Selects a scale for use with Doppler.	Freq (frequency scale only), Vel (velocity scale only), or F/V (velocity and frequency scale)

## Color Flow LCD Selections

When Color Flow is active, you can access the related LCD selections by rotating the **FUNCTION SELECT** control on the LCD panel to highlight the **C** tab on the LCD.

LCD Selection	Description	Settings
<b>OWindow</b>	Adjusts the position or size of the color ROI using the trackball.	POS (position) or Size
<b>O2D FOV</b>	Reduces the field of view (FOV) for the 2D image to equal the width of the color ROI by using the trackball.	Off, FOV, POS
<b>OPSP/QSP</b>	Selects <b>PSP</b> (Parallel Signal Processing), <b>QSP</b> (Quad Signal Processing), or <b>Off</b> . The Color PSP is independent of the 2D-mode PSP.  The QSP setting is only available for phased array transducers.	Off, PSP, QSP
<b>OPersistence</b>	Causes the signals obtained from blood flow to remain in the color ROI for longer periods of time when the setting is increased.	Off, 1, 2, 3, 4, 5, 6, or 7
<b>OColor Scale</b>	Displays color flow in both directions (Full – red and blue), toward the transducer only (Up – red), or away from the transducer only (Down – blue).	Full Up Down
<b>OFlow Stage</b>	Allows selection of system settings that are closely optimized for hemodynamic flow conditions.  H – high velocity and low resistance HM – medium high velocity M – medium velocity and high resistance ML – medium low velocity L – low velocity and low resistance	H, HM, M, ML or L
<b>ODensity</b>	Selects the density of acoustic lines passing through the color ROI. Increasing the line density increases resolution and decreases frame rate.	1, 2, 3, 4, or 5
<b>OPeak</b>	Designates the period of time that peak color velocities are accumulated for display.	Off, 1sec, 2sec, or 3sec
<b>OVel Tag</b>	Specifies a velocity or a range of velocities to display in a bright green color. The color designation can help to detect clinically significant flow stages.	Off, Rng, Point
<b>OColor Map</b>	Selects the range of colors that are applied to the velocity range in mapping blood flow.	A, B, C, or D

LCD Selection	Description	Settings
<b>OMotion Cut</b>	Increases or decreases the threshold of the high pass filter. Higher settings provide more filtering and reduction of motion artifacts. Lower settings provide better sensitivity to lower velocities and small vessel detection, with minimal reduction of motion artifacts.	1, 2, 3, or 4
<b>ONoise Cut</b>	Increases or decreases the value of the spatial filter, which reduces the random noise level, by looking at adjacent pixels to determine if a value is real or the result of noise.	Off, 1, 2, 3, 4, 5, 6, 7, 8, or 9
<b>OTemporal</b>	Averages velocity values for a number of transmit pulses per acoustic line to optimize color flow signal-to-noise ratio. Higher values of this setting increase sensitivity, but decrease frame rate.	1, 2, or 3
<b>OC Priority</b>	Optimizes color over 2D-mode.	0 (2D-mode), 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, or 12 (color)

## Power Mode LCD Selections

When Power mode is active, you can access the related LCD selections by rotating the **FUNCTION SELECT** control on the LCD panel to highlight the **P** tab on the LCD.

LCD Selection	Description	Settings
<b>OWindow</b>	Adjusts the <b>Position</b> or <b>Size</b> of the color ROI.	POS (position) or Size
<b>O2D FOV</b>	Reduces the field of view (FOV) for the 2D image to equal the width of the color ROI by using the trackball.	Off, FOV, POS
<b>OPSP/QSP</b>	Selects Parallel Signal Processing or Quad Signal Processing. The QSP setting is only available for phased array transducers.	Off, PSP, QSP
<b>OPersistence</b>	Causes the signals obtained from blood flow to remain in the color ROI for longer periods of time when the setting is increased.	Off, 1, 2, 3, 4, 5, 6, or 7
<b>OFlow Stage</b>	Allows selection of system settings that are closely optimized for hemodynamic flow conditions. H – high velocity and low resistance HM – medium high velocity M – medium velocity and high resistance ML – medium low velocity L – low velocity and low resistance	H, HM, M, ML, or L
<b>ODensity</b>	Selects the density of acoustic lines passing through the color ROI. Increasing the line density increases resolution and decreases frame rate.	1, 2, 3, 4, or 5
<b>ORange</b>	Selects the dynamic range for Power mode.	10 to 70 in increments of 5
<b>OFlash</b>	Selects a level of tissue motion discrimination.	1, 2, 3, 4, or 5
<b>OPower Map</b>	Selects a color display for Power mode. The energy map overlays the gray scale image.	1, 2, 3, 4, 5, or 6
<b>ODir Power</b>	Select a map to identify direction of flow in relationship to the transducer.	A, B, C, or D

LCD Selection	Description	Settings
<b>OMotion Cut</b>	Increases or decreases the threshold of the high pass filter. Higher settings provide more filtering and reduction of motion artifacts. Lower settings provide better sensitivity to lower velocities and small vessel detection, with minimal reduction of motion artifacts.	1, 2, 3, or 4
<b>ONoise Cut</b>	Increases or decreases the value of the spatial filter, which reduces the random noise level, by looking at adjacent pixels to determine if a value is real or the result of noise.	Off, 1, 2, 3, 4, 5, 6, 7, 8, or 9
<b>OTemporal</b>	Averages velocity values for a number of transmit pulses per acoustic line to optimize color flow signal-to-noise ratio. Higher values of this setting increase sensitivity, but decrease frame rate.	1, 2, or 3
<b>OC Priority</b>	Optimizes color over 2D-mode.	0 (2D-mode), 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, or 12 (color)

## CINE LCD Selections

When CINE is active, you can access the related LCD selections by rotating the **FUNCTION SELECT** control on the LCD panel to highlight the **CINE** tab on the LCD.

LCD Selection	Description
<b>OFrame Review</b>	Displays individual frames in a forward or reverse direction, in response to the trackball. Frame numbers are displayed.  For motion modes (M or Doppler), one frame of time motion data is displayed at a time. No frame numbers are displayed.
<b>OMotion Review</b>	Displays CINE data in a continuous, forward direction. Reverse motion is not available.
<b>OEdit Start</b>	Defines new beginning and ending points of a loop of CINE data.  Resets the beginning and ending points to their originally acquired positions.  Synchronizes the CINE display of the dual images during Dual mode.  Changes the speed of CINE review while in Motion Review.  <b>Note:</b> The signal of a Doppler spectrum is not audible when the review speed has been adjusted with the <b>ORate</b> LCD selection.
<b>OEdit End</b>	
<b>OEdit Reset</b>	
<b>OAlign</b>	
<b>ORate</b>	

## ECG LCD Selections

When ECG is active, you can access the related LCD selections by rotating the **FUNCTION SELECT** control on the LCD panel to highlight the **ECG** tab on the LCD.

Use the system presets to enable the ECG function to automatically activate when an exam type is selected.



**F4**

Default Setting

► ECG

LCD Selection	Description	Settings
<b>On/Off</b>	Activates ( <b>On</b> ) the ECG function.	On, Off
<b>CH 1 Delay</b>	Selects the channel 1 trigger point in the cardiac cycle where the system updates the image from ventricular depolarization, or the 'R' value of the ECG tracing.	0 ms to 990 ms in increments of 10
<b>Position</b>	Adjusts the vertical position of the ECG trace on the image screen.	0 to 31 in increments of 1
<b>Gain</b>	Increases or decreases the trace amplitude.	0 to 63 in increments of 1
<b>CH 2 Delay</b>	Selects the channel 2 trigger point in the cardiac cycle where the system updates the image from ventricular depolarization, or the 'R' value of the ECG tracing.	0 ms to 990 ms in increments of 10
<b>External</b>	Activates ( <b>On</b> ) the external ECG function.	On, Off
<b>Single</b>	Selects Single or Dual trigger within one cardiac cycle.	Sngl, Dual
<b>Trigger</b>	Enables ECG-triggered acquisition of 2D-mode data.	On, Off

## LCD Selections for All Measurements and Calculations

When the Measurement function is active, you can access these selections after completing a measurement by pressing the **SELECT** control on the control panel.

Selection	Description
<b>Modify</b>	Activates the Modify feature for editing measurements.
<b>Delete</b>	Activates the Delete feature for removing measurements from the screen. The values of the removed measurements remain in the Measured Results and in the patient report.
<b>Delete All</b>	Removes all measurements from the screen. The values of the removed measurements remain in the Measured Results and in the patient report.

## LCD Selections for 2D-Mode Measurements and Calculations

When the Measurement function is active, you can access these selections by rotating the **FUNCTION SELECT** control on the LCD panel to highlight the **2D** tab on the LCD.

Use the system presets to customize the first page of LCD selections for each exam type. The full list of available selections for 2D-mode is shown below.



**F4**

M&R

- Measurement and Report Preset
- Customize General Measurement LCD

LCD Selection	Description
<b>OFlow Volume</b>	Measures distance or area to calculate an estimate of blood flow volume.
<b>O%Stenosis</b>	Perform a % stenosis calculation based on the area or diameter of the same vessel.
<b>OVolume</b>	Perform a volume measurement in either two planes or one plane. Measurement methods available for calculating a volume in two planes are: LxDxW, Ellipse, and Trace. Measurement methods available for calculating a volume in one plane are: LxD, Ellipse, and Disc.
<b>OArea</b>	Calculates the area using <b>Spline</b> , <b>Cross</b> , <b>Ellipse</b> , or <b>Trace</b> method.
<b>OUndo</b>	Removes the last measurement label and assigned value from the Measured Results and report.
<b>OAB Ratio</b>	Ratio of measurements. The system calculates the ratios A/B, B/A and (A-B)/A from the 2D-mode measurements: distance, area, or volume.
<b>OAngle</b>	Determines the angle using two lines you place on the image. The lines must connect or intersect.
<b>ODistance</b>	Simple linear measurement between two points.
<b>OSpline</b>	A graphical component of a measurement tool. It is a system-generated curve based on three measurement points using a spectral waveform.
<b>OCross</b>	A measurement tool that utilizes two distances perpendicular to each other.
<b>OEllipse</b>	Elliptical measurement. The system determines one diameter using the end points of the ellipse and calculates the second diameter.
<b>OTrace</b>	Free hand trace method. Roll the trackball to delineate an area. The system determines the circumference and area using the trace segments.
<b>O2PI Trace</b>	Calculate volume by manually tracing structures in two planes.
<b>OTrace Length</b>	Trace distance measurement between two points.



LCD Selection	Description
<b>OThyroid</b>	Calculates volume by measuring three distance measurements in two image planes.
<b>OResidual</b>	Calculates volume by subtracting a post-void volume from a pre-void volume.
<b>O1PI Disk</b>	Calculate a one-plane volume using the trackball to trace a structure and then positioning an axis line to be used for an assumed dimension in a second plane.
<b>O2PI Ellipse</b>	Calculate volume by measuring an ellipse in two planes.
<b>O2PI LxDxW</b>	Calculate volume by measuring length and depth in one plane and width in a second plane.
<b>O1PI Ellipse</b>	Calculate volume by measuring an area with an ellipse and identifying the axis common to both planes.
<b>O1PI LxD</b>	Calculate volume by measuring length and depth in one plane and assuming the same dimensions in the second plane.
<b>OVol Ratio</b>	Calculate ratios A/B, B/A, and (A-B)/A for volume.
<b>OArea Ratio</b>	Calculate ratios A/B, B/A, and (A-B)/A for area.
<b>ODist Ratio</b>	Calculate ratios A/B, B/A, and (A-B)/A for distance.
<b>OA-Flow Volume</b>	Calculate an estimate of blood flow volume based on area, requiring measurements in 2D-mode and Doppler.
<b>OD-Flow Volume</b>	Calculate an estimate of blood flow volume based on diameter, requiring measurements in 2D-mode or M-mode and Doppler.
<b>OA-% Stenosis</b>	Calculate area % stenosis, comparing cross-sectional areas of the same vessel.
<b>OD-% Stenosis</b>	Calculate diameter % stenosis, comparing diameters of the same vessel.
<b>O2D Top</b>	Accesses the first page of LCD selections.

## LCD Selections for M-Mode Measurements and Calculations

When the Measurement function is active, you can access these selections by rotating the **FUNCTION SELECT** control on the LCD panel to highlight the **M** tab on the LCD.

Use the system presets to customize the first page of LCD selections for each exam type. The full list of available selections for M-mode is shown below.



**F4**

M&R

- ▶ Measurement and Report Preset
- ▶▶ Customize General Measurement LCD

LCD Selection	Description
<b>OFlow Volume</b>	Diameter flow volume. This measurement is an estimate of blood flow volume and requires measurements in two modes: two diameter measurements in M-mode and a Doppler Time Average Velocity measurement.
<b>OVelocity</b>	Distance over time. The measurement is determined by two distance measurement markers.
<b>OSlope</b>	Distance over time. The measurement is determined by two distance measurement markers.
<b>ODistance</b>	Vertical distance between two points in the M-mode sweep.
<b>OA/B Ratio</b>	Ratio of measurements. The ratios are A/B, B/A and (A-B)/A. Ratios can be determined for Distance, Heart Rate or Time measurements.
<b>OHR</b>	Heart rate determined over one heart cycle in 2D/M-mode.
<b>OTime</b>	Interval in seconds between two measurement markers.
<b>OTime Ratio</b>	Calculate ratios A/B, B/A, and (A-B)/A for time.
<b>ODist Ratio</b>	Calculate ratios A/B, B/A, and (A-B)/A for distance.
<b>OM Top</b>	Accesses the first page of LCD selections.
<b>OUndo</b>	Removes the last measurement label assigned value from the Measured Results and report.

## LCD Selections for Doppler Measurements and Calculations

When the Measurement function is active, you can access these selections by rotating the **FUNCTION SELECT** control on the LCD panel to highlight the **D** tab on the LCD.

Use the system presets to customize the first page of LCD selections for each exam type. The full list of available selections for Doppler is shown below.



**F4**

M&R

- ▶ Measurement and Report Preset
- ▶▶ Customize General Measurement LCD

LCD Selection	Description
<b>OFlow-Volume</b>	Selects methods for estimating blood flow volume.
<b>OPI Trace</b>	Selects a trace method to determine a pulsatility index. Pulsatility index is the peak systole minus end diastole, divided by a TAV (Time Averaged Velocity). The default is TAMx (Time Average Maximum Velocity). If you select a diastole which crosses the baseline, the Resistance Index does not display in the Measured Results.
<b>OAccel</b>	Acceleration or Deceleration of speed over the time traveled determined by two measurement markers.
<b>OVelocity</b> (Frequency)	Distance over time. The measurement is determined by a measurement marker placed along a vertical plane. The LCD selection depends upon whether the Velocity or the Frequency scale is currently displayed.
<b>OUndo</b>	Removes the last measurement label and assigned value from the Measured Results and report.
<b>ORI - S/D</b>	Resistance Index is the peak systole minus the minimum diastole divided by the peak systole.
<b>OHR</b>	Heart rate determined over one heart cycle.
<b>OTime</b>	Interval in milliseconds between two measurement markers.
<b>OAB Ratio</b>	Ratio of measurements. The ratios are A/B, B/A and (A-B)/A, and can be used with Velocity or Frequency measurements.
<b>OPoint Value</b>	This function displays the Maximum, Minimum, Mean, and Mode velocity values for any point in time determined by placement of one measurement marker.
<b>OAve Values</b>	This function displays the Maximum, Minimum, Mean, and Mode time-averaged velocity values for any point in time determined by placement of one measurement marker.
<b>OPI Auto</b>	Use an automatic trace of the spectrum to determine a pulsatility index.
<b>OPI Manual</b>	Use a manual trace of the spectrum to determine a pulsatility index.
<b>OA-Flow Volume</b>	Area Flow Volume requires measurements in two modes: an area measurement in 2D-mode using an ellipse, circle, or trace, and a TAV (time averaged velocity) measurement from Doppler.
<b>OD-Flow Volume</b>	Diameter Flow Volume requires measurements in two modes: a 2D-mode diameter or two M-mode diameter measurements, and a TAV measurement from Doppler. TAMn is the TAV measurement default.
<b>OD Top</b>	Accesses the first page of LCD selections.

## VCR LCD Selections

LCD Selection	Description
<b>ORewind</b>	Rewinds the tape without viewing the contents on the image screen.
<b>OFast Forward</b>	Advances the tape without viewing the contents on the image screen.
<b>OTape Search</b>	Reviews video playback in a forward or backward direction.  <b>Note:</b> To advance the tape, roll the trackball to the right; to rewind the tape, roll the trackball to the left.  <b>Note:</b> Your movement of the trackball controls the speed of the tape search. Minimal trackball movement searches the tape at the slowest speed; to increase the speed of the search, increase trackball movement.
<b>OStep Frame</b>	Reviews individual video frames.  <b>Note:</b> To advance to the next frame, roll the trackball to the right; to view the previous frame, roll the trackball to the left.
<b>OEject</b>	Ejects the videocassette from the VCR.
<b>OStop</b>	Stops playback or recording.
<b>OPause</b>	Pauses playback or recording.
<b>OPlay</b>	Starts playback.
<b>OManual Counter</b>	If playback is stopped, displays the <b>Manual Counter</b> window and then resets the counter displayed on the VCR to the value you enter.
<b>OCounter Search</b>	If playback is stopped, displays the <b>Counter</b> window and then searches the tape for the counter value you enter. Displays the corresponding frame if the search is successful.
<b>OViss Write</b>	Writes a Viss (VHS Index Search System) relative position indicator ("bookmark") on the displayed frame of the tape. Viss position indicators remain on the tape until you record new data over them.  No maximum exists for the number of Viss position indicators per tape.
<b>OViss Search</b>	Displays the <b>Viss</b> dialog box if playback is stopped. (Viss stands for VHS Index Search System.)  Entry of "00" initiates the continuous search-and-playback feature. Entry of another number initiates a search for the related position indicator ("Viss bookmark"). Searches occur in the indicated direction ( <b>Rewind</b> or <b>Fast Forward</b> ).  Valid Viss numbers (position indicators) for entry into the <b>Viss</b> dialog box are 00 - 39.

## Biopsy/Puncture LCD Selections

Use the system presets to enable the Biopsy function to automatically activate when an exam type is selected.



**F4**

Default Setting

► Biopsy

LCD Selection	Description
<b>OReset Angle</b>	Restores the original position of the biopsy/puncture guidelines.
<b>OGuide</b>	Selects biopsy guidelines <b>On</b> or <b>Off</b> .
<b>OAngle Adjust</b>	Finely adjusts the angle of the biopsy/puncture guidelines.
<b>ODot Interval</b>	Selects dot sizes to represent guidelines.
<b>ODisplay cm</b>	Displays centimeter markings (numbers) indicating depth along the guidelines.

## SieScape Panoramic Imaging Option LCD Selections

**Note:** The LCD display is blank until a SieScape image is acquired.

LCD Selection	Description
<b>ORedisplay</b>	In <b>Setup</b> or CINE Review, reactivates the Review screen.
<b>ORestore</b>	In <b>Review</b> , scales the SieScape image to the original display of the frozen image.
<b>OSetup</b>	In <b>Review</b> or CINE Review, reactivates the Setup screen.
<b>OCine</b>	In <b>Review</b> , activates CINE Review.
<b>OScale Display</b>	In <b>Review</b> or CINE Review, displays a flexible ruler with markers along the skin line.
<b>OFull</b>	In <b>Review</b> , scales the image to its full acquisition size.
<b>OBest Fit</b>	In <b>Review</b> , automatically scales the image to fit the image area.

## Selections Used in the Stress Echo Feature

(Requires the Cardiac Imaging option and P4-2 transducer.)

When you use the Stress Echo feature, you use selections from several windows, dialog boxes, and screens.

### Select Protocol to Load Dialog Box

The **Select Protocol to load** dialog box lists all the available protocols. The default list includes the following protocols:

- Dobutamine Stress Echo
- Ergometric Stress Echo
- Treadmill
- Ergometric continuous
- Treadmill continuous
- Ergometric continuous R-R
- Treadmill continuous R-R

### Protocol Window














Continuous stages, unlike non-continuous stages, do not display views in the Protocol window. The system responds as follows for non-continuous stages. (Phases are stages.) The **Protocol** window lists the phases and views of the selected protocol. At the beginning of acquisition, the system expands the first phase to list its constituent views; all other phases are contracted. The system expands the next phase in the sequence once images have been acquired for each view in the current phase. When the last phase is completed, the system activates **Stop** for your selection.










## Stress Echo Screen

Selections used in the Stress Echo screen include toolbar buttons and the buttons available during each Stress Echo mode.

### Toolbar Buttons ■ Stress Echo

During all Stress Echo modes, the following toolbar buttons display at the top of the Stress Echo screen.

Toolbar button	Description
	<b>Acquire Mode</b> Exits the Stress Echo screen and redisplay the real-time imaging screen. This button is available only when acquisition of Stress Echo loops is not yet complete.
	<b>Select Mode</b> Enables <b>Select Mode</b> .
	<b>Review Mode</b> Enables <b>Review Mode</b> .
	<b>Wall Motion Scoring Mode</b> Enables <b>Wall Motion Scoring Mode</b> .
	<b>LV Mode</b> Enables <b>LV Mode</b> .
	<b>Indication</b> Displays the <b>Indication</b> dialog box.
	<b>Save Examination</b> Saves the Stress Echo data with all loops (all loops acquired for each view or continuous stage).
	<b>Save Examination (only selected loops)</b> Saves the Stress Echo data with loops selected as "preferred" only (one representative loop for each view).
	<b>Report Preview</b> Displays the report for the current mode when available. Reports are available for <b>Wall Motion Scoring Mode</b> and <b>LV Mode</b> .
	<b>VCR recording</b> Records Stress Echo data to videotape.
	<b>Print</b> Prints the report for the current mode when available. Reports are available for <b>Wall Motion Scoring Mode</b> and <b>LV Mode</b> .
	<b>Maintenance</b> Displays the <b>Maintenance</b> dialog box.
	<b>Exit</b> Closes the Stress Echo screen and exits the Stress Echo feature; redisplay the real-time imaging screen. The current patient examination remains active.







Toolbar button	Description
	<b>Toggle Play</b> When enabled (highlighted), plays back the loops. When disabled (not highlighted), displays one frame for each loop.
	<b>Start of sequence</b> Displays the first frame of each loop.
	<b>Step backward</b> Displays the previous frame of each loop.
	<b>Step forward</b> Displays the next frame of each loop.
	<b>End of sequence</b> Displays the last frame of each loop.
	<b>Decrease Speed</b> Decreases the speed of loop playback.
	<b>Increase Speed</b> Increases the speed of loop playback.
	<b>Sweeping play</b> Plays back loops in both directions, forward from beginning systole to end systole and then reversed from end systole to beginning systole. The system initially plays back the displayed loops in one direction, from beginning systole to end systole. When the last frame is played, the system reverses the playback direction, playing back the displayed loops from end systole to beginning systole.
	<b>Labels on/off</b> Removes labels from loops.
—	<b>Loop segment</b> Specifies the loop segment for display. Drop-down list. Available settings: <ul style="list-style-type: none"> <li>▪ <b>Systole</b>—displays the systole segment only (all loops)</li> <li>▪ <b>User-defined</b>—allows manual repositioning of review markers on the loop bar to exclude frames from review (selected loop only)</li> <li>▪ <b>Fixed range</b>—displays the – and + buttons for repositioning of review markers on the loop bar to exclude frames from review (all loops)</li> </ul>







## Select Mode Selections ■ Stress Echo

**Note:** For a continuous stage, the **Home**, **To Left**, **To Right**, and **End** buttons display loops saved for the stage (not the view).









**Note:** For a continuous stage, the **Scroll Up** and **Scroll Down** buttons display the preferred loop for the view. If no loop is designated as preferred for the selected view, then these buttons have no effect.

Button in Select Mode	Selection	Description
	<b>Scroll Up</b>	Displays loops in the previous view.
	<b>Scroll Down</b>	Displays loops in the next view.
	<b>Home</b>	Selects the first loop in the currently displayed view.
	<b>To Left</b>	Selects the previous loop in the currently displayed view.
	<b>To Right</b>	Selects the next loop in the currently displayed view.
	<b>End</b>	Selects the last loop in the currently displayed view.



## Review Mode Selections ■ Stress Echo

Button in Review Mode	Selection	Description
	<b>Shuffle Mode</b>	Displays the view with the selected (highlighted) label for the phase with the selected (highlighted) label.  This button is available only when the <b>Display Selected Loops</b> button is disabled.
	<b>Shuffle back</b>	Displays the previous view when that view is not deselected.  This button is available only when the <b>Display Selected Loops</b> button is disabled.
	<b>Shuffle forward</b>	Displays the next view when that view is not deselected.  This button is available only when the <b>Display Selected Loops</b> button is disabled.
	<b>Display Selected Loops</b>	Displays the selected phases side by side for each selected view.  This button is available only when the <b>Shuffle Mode</b> button is disabled.

## Wall Motion Scoring Mode Selections ■ Stress Echo

Button in Wall Motion Scoring Mode	Selection	Description
	<b>Shuffle Mode</b>	Displays the view with the selected (highlighted) label for the phase with the selected (highlighted) label.  This button is available only when the <b>Display Selected Loops</b> button is disabled.
	<b>Shuffle back</b>	Displays the previous view when that view is not deselected.  This button is available only when the <b>Display Selected Loops</b> button is disabled.
	<b>Shuffle forward</b>	Displays the next view when that view is not deselected.  This button is available only when the <b>Display Selected Loops</b> button is disabled.
	<b>Display Selected Loops</b>	Displays the selected phases side by side for each selected view.  This button is available only when the <b>Shuffle Mode</b> button is disabled.
<b>X, 1, 2, 3, 4...</b>		Designates the score to be used for assignment when you select a portion of the WMS graphic. The numbers displayed correspond to the <b>WMS Type</b> selected in the <b>Maintenance</b> dialog box.
	<b>Selected Loop Normal</b>	Assigns the "Normal" score to the selected view.
	<b>All Visible Loops Normal</b>	Assigns the "Normal" score to all displayed views.
	<b>Toggle Display</b>	Toggles placement of views with placement of WMS graphics. At first selection, the system displays the views (reduced in size) on the lower right of the screen and displays the corresponding WMS graphics (magnified) on the review section of the screen. At second selection, the system displays the views and WMS graphics in their original sizes and locations.
	<b>Enter WMS Comment</b>	Displays the <b>WMS Comment</b> dialog box and then saves the entered text to the <b>WMS-Report</b> .

## LV Mode Selections ■ Stress Echo

Button in LV Mode	Selection	Description
	<b>Delete Contour</b>	Erase the last trace line created.
	<b>Enter LV Comment</b>	Displays the <b>LV Function Comment</b> dialog box and then saves the entered text to the <b>LV-Report</b> .

## Maintenance Dialog Box ■ Stress Echo

Maintenance Dialog Box Selection	Description
<b>Reference Image</b>	
<b>On</b>	Enables display during acquisition of the reference image (the view in the initial phase that corresponds to the selected view).  <b>Note:</b> The reference image is displayed if the initial stage was non-continuous.
<b>Off</b>	Disables display during acquisition of the reference image (the view in the initial phase that corresponds to the selected view).
<b>Acquire Mode</b>	
<b>Manual ROI</b>	Enables display of ROI (region of interest) after the Stress Echo protocol is selected. The ROI can be resized and/or repositioned as required. The ROI determines the portion of the image area to be saved.
<b>Fixed ROI</b>	Implicitly sets the ROI to exclude a portion of the bottom of the image; for each image saved, the system captures all of the image area except the excluded portion at the bottom of the image. No ROI is displayed after the Stress Echo protocol is selected.
<b>Fullscreen</b>	Implicitly sets the ROI to include the gray bar in addition to the image area; for each image saved, the system captures the entire image area and the gray bar. No ROI is displayed after the Stress Echo protocol is selected.
<b>Image Compression</b>	
<b>High</b>	Sets image compression during acquisition to High (12:1).
<b>Medium</b>	Sets image compression during acquisition to Medium (8:1).
<b>Overlay</b>	
<b>Name of level</b>	Displays the phase label on the loop in the Stress Echo screen.
<b>Name of view</b>	Displays the view label on the loop in the Stress Echo screen.
<b>Heartrate</b>	Displays the heart rate at which the loop was acquired on the loop in the Stress Echo screen.
<b>Time stamp acquisition</b>	Displays the time of acquisition on the loop in the Stress Echo screen.
<b>Timespan since start of level</b>	Displays the time elapsed from the beginning of the phase to this loop's acquisition on the loop in the Stress Echo screen. This value can be used in an exercise-based stress echo protocol to indicate the time elapsed since the patient began exercising.
<b>Compression Ratio</b>	Displays the compression ratio of the corresponding loops on the loop in the Stress Echo screen.
<b>WMS Type</b>	
<b>ASE 16 – 4 Scores</b>	Configures the system to display the indicated type of WMS graphics (16-segment or 17-segment).
<b>ASE 17 – 4 Scores</b>	Configures the system to display the following WMS scores for assignment: <ul style="list-style-type: none"> <li>▪ X – Cannot evaluate</li> <li>▪ 1 – Normal</li> <li>▪ 2 – Hypokinetic</li> <li>▪ 3 – Akinetic</li> <li>▪ 4 – Dyskinetic</li> </ul>

<b>Maintenance Dialog Box Selection</b>	<b>Description</b>
<b>ASE 16 – 5 Scores</b>	Configures the system to display the indicated type of WMS graphics (16-segment or 17-segment).
<b>ASE 17 – 5 Scores</b>	Configures the system to display the following WMS scores for assignment: <ul style="list-style-type: none"> <li>▪ X – Cannot evaluate</li> <li>▪ 1 – Normal</li> <li>▪ 2 – Hypokinetic</li> <li>▪ 3 – Akinetic</li> <li>▪ 4 – Dyskinetic</li> <li>▪ 5 – Aneurysmal</li> </ul>
<b>ASE 16 – 7 Scores</b>	Configures the system to display the indicated type of WMS graphics (16-segment or 17-segment).
<b>ASE 17 – 7 Scores</b>	Configures the system to display the following WMS scores for assignment: <ul style="list-style-type: none"> <li>▪ X – Cannot evaluate</li> <li>▪ 1 – Normal</li> <li>▪ 2 – Hypokinetic</li> <li>▪ 3 – Akinetic</li> <li>▪ 4 – Dyskinetic</li> <li>▪ 5 – Aneurysmal</li> <li>▪ 6 – Akinetic with scar</li> <li>▪ 7 – Dyskinetic with scar</li> </ul>
<b>Print colored</b>	Prints the report in color when checked.
<b>LV Trace Line</b>	
<b>Solid Line</b>	Configures the system to display a solid line when you create an LV trace.
<b>Dotted Line</b>	Configures the system to display a dashed line when you create an LV trace.
<b>Printer</b>	Allows you to select a printer from a drop-down menu.
<b>QT – Time Table</b>	
<b>Heartrate</b>	Allows you to enter a heart rate. When a heart rate and systolic duration are both entered, you can add this pair of values to the <b>QT – Time Table</b> .
<b>Syst. Duration</b>	Allows you to enter a systolic duration. When a heart rate and systolic duration are both entered, you can add this pair of values to the <b>QT – Time Table</b> .
<b>Factory Settings</b>	Applies factory defaults for systolic durations and heart rates.
<b>Update</b>	Adds the entered heart rate and systolic duration to the <b>QT – Time Table</b> .
<b>Delete</b>	Removes the selected heart rate and systolic duration pair from the <b>QT – Time Table</b> .
<b>Save</b>	Saves changes.
<b>Protocol Editor</b>	Displays the <b>Protocol Editor</b> dialog box.
<b>Quit</b>	Exits the <b>Maintenance</b> dialog box.

## Protocol Editor Dialog Box ■ Stress Echo

**Note:** Phases are stages.

Protocol Editor Dialog Box Selection	Description
<b>Protocol Name</b>	<ul style="list-style-type: none"> <li>When the <b>Load</b> button is selected, displays the name of the loaded protocol.</li> <li>When the <b>New</b> button is selected, allows you to enter a new protocol name.</li> </ul>
<b>Stage</b>	
<b>Description</b>	<ul style="list-style-type: none"> <li>When the <b>Load</b> button is selected, displays the name of the first phase (or selected phase).</li> <li>When the <b>New</b> button is selected, allows you to enter a new phase name.</li> </ul>
<b>continuous</b>	<ul style="list-style-type: none"> <li>When <b>Yes</b> is selected, designates the stage as continuous.</li> <li>When <b>No</b> is selected, designates the stage as non-continuous.</li> </ul>
<b>Loops</b>	When a phase is selected in the <b>Phase</b> list, allows you to select the number of loops to be acquired for each view in the selected phase.
<b>View</b>	
<b>Standard Views</b>	Lists the standard views available for selection to be included in the protocol. The selected views are displayed for every phase in the protocol.
<b>Trigger</b>	<p>Specifies the heart cycle portion(s) captured by the protocol.</p> <ul style="list-style-type: none"> <li><b>R-R Systolic</b> captures only the systolic portion of the heart cycle.</li> <li><b>R-R Full</b> captures the full heart cycle (systolic and diastolic portions).</li> </ul> <p><b>Note:</b> The captured heart cycle segments (portions) can be edited. You can select loop segments for display or you can reposition the review markers.</p>
<b>WMS model</b>	Lists the WMS models available for selection to be used by default in the protocol.
<b>New</b>	Clears the <b>Protocol Name</b> selection and allows you to create a new protocol.
<b>Load</b>	Displays the <b>Select Protocol to load</b> dialog box and then displays information about the selected protocol within the <b>Protocol Editor</b> dialog box.
<b>Save</b>	Saves changes.
<b>Delete</b>	Removes the protocol from memory.
<b>Quit</b>	Exits the <b>Protocol Editor</b> dialog box.

## Selections in DIMAQ-IP

### LCD ■ DIMAQ-IP

When the Study screen, or Image screen is active, the LCD displays the following selection:

LCD Selection	Description
<b>OShow Archive</b>	In the Study screen, displays the archival history for the selected study.
<b>OShow All</b>	Exits simultaneous display and displays all images in the study.
<b>OShow Selected</b>	In the Image screen, displays the selected images in a new Image screen.
<b>OClear Selected</b>	In the Image screen, clears all selected images.
<b>OUnselect Image</b>	In the Image screen, unselects the image.
<b>OSelect Image</b>	In the Image screen, selects the image.
<b>OHide Softpanel</b>	In the Image screen, displays only the images.
<b>OShow Softpanel</b>	In the Image screen, displays the DIMAQ-IP soft panel.

## Study Screen ■ DIMAQ-IP

In the upper half of the Study screen, the system displays all studies that are saved on the currently selected disk in the **Disk** section of the screen. The columns displayed in the upper half of the screen include **Patient Name**, **Patient ID**, **Date/Time**, **Images**, **Archived**, **MBytes**, and **Clips**.

On the upper left of the Study screen, the system indicates the number of studies displayed (and the total number of studies).

On the upper right of the Study screen, the system displays the utilized capacity and the total capacity of the selected disk (**HD** or **CD/DVD**).

You can select multiple studies for export, import, or deletion.

If the DICOM option is installed on the ultrasound system, then additional selections display on this screen.

At the top of the Study screen, the system indicates the file size of the selected studies (when multiple studies are selected). The system displays the number of megabytes selected.

Use the system presets to indicate the status of network connection in the **Network** section of the Study screen.

In the **CD/DVD** section of the Study screen, the system indicates system recognition of the inserted CD/DVD (for example: **Ready**) and indicates the used space on the CD/DVD

### System Reference

DICOM selections Ch 6



**F4**

DIMAQ Utility

Study Screen Selection	Description
<b>Hide Studies</b>	Limits the display of studies to those newer than the age (of the study) selected in the drop-down list (for studies on hard disk only).
<b>Screen</b>	
<b>Image Screen</b>	Displays the Image screen with the images and/or clips from the selected study.
<b>Worklist Screen</b>	(Requires the DICOM option) Displays the <b>Worklist</b> screen.
<b>Procedure Screen</b>	(Requires the DICOM option and the DICOM Modality Worklist option) Displays the <b>Choose procedure</b> screen for selection of another procedure for the currently registered patient. <b>Note:</b> This selection is available when a connected DICOM Worklist server contains multiple procedures for the currently registered patient.
<b>Live Screen</b>	Exits the Study screen and the Review function; redisplay the real-time imaging screen.
<b>DICOM Screen</b>	(Requires the DICOM option) Displays the DICOM screen.

Study Screen Selection	Description
<b>Search for Studies</b>	
<b>Search...</b>	Displays a dialog box for entry of patient name, ID, and/or study date and then searches the currently selected disk for matching studies.
<b>Show All</b>	Displays all studies that are stored on the currently selected disk.
<b>Disk</b>	
<b>HD</b>	Lists studies on the system's hard disk.
<b>CD/DVD</b>	Lists studies on the inserted compact disk (CD).
<b>CD/DVD</b>	
<b>Export</b>	Copies the selected study from the system's hard disk to a CD. This selection is available when the <b>Disk</b> selection is <b>HD</b> , a CD is inserted, and a completed study is selected.
<b>Import</b>	Copies the selected study from a CD to the system's hard disk. This selection is available when the <b>Disk</b> selection is <b>CD</b> , a CD is inserted, and a completed study is selected.
<b>Eject</b>	Ejects the CD.
<b>Load</b>	Closes the CD tray.
<b>Finalize</b>	Prevents additional storage to the currently inserted CD and makes the CD readable from CD-R drives (read-only CD drives).
<b>Export format</b> (displayed for HD only)	Specifies the format(s) of exported images: <ul style="list-style-type: none"> <li>▪ <b>Tiff/AVI</b> exports images in the "Tagged Image File Format" (TIFF) format and clips in the AVI (audio-video interleave) format.</li> <li>▪ <b>DICOM</b> exports images in the DICOM (Digital Images and Communications in Medicine) format.</li> </ul> <p><b>Note:</b> DICOM-formatted images cannot be used for measurements on the ultrasound system. If you plan to use exported images for measurements, then select the <b>Tiff/AVI</b> check box to archive Tiff-formatted images and AVI-formatted clips.</p>
<b>Study</b>	
<b>New</b>	Creates a new study by re-registering the patient listed in the selected study.
<b>Close</b>	Closes the selected study.
<b>Delete</b>	Removes the selected study from the hard disk. Studies on a CD cannot be deleted using the DIMAQ-IP Study screen.
<b>Network</b>	
<b>Send</b>	(Requires the DICOM option) Copies the images from the selected study to the destination selected from the drop-down list.
(drop-down list)	Lists the available destinations, such as printers and servers.
<b>Preview</b>	Displays the first clip or image of the selected study in preview format.



## Image Screen ■ DIMAQ-IP

**Note:** The term "Image screen" (Upper case "I") refers to a screen with the DIMAQ-IP integrated workstation. The term "image screen" (Lower case "i") refers to a typical image screen that displays real-time images as they are acquired.

At the top of the Image screen, the system displays the **Patient Name**, **Patient ID**, and **Date/Time** of the study containing the displayed images.

If the DICOM option is installed on the ultrasound system, then additional selections display on this screen.

### [2] Instructions for Use

Example of Typical  
Image Screen Ch A1

### System Reference

DICOM  
Selections Ch 6







Image Screen Selection	Description
<b>1 x 1, 2 x 2, 3 x 3, 4 x 45 x 5</b>	Specifies the layout format, which determines the number of images per page.
	When enabled (checked), locks the selected layout format until system shutdown. When disabled (unchecked), the system optimizes the display format (layout format) to fit the number of images contained in the selected study onto one page.
<b>BW Print</b>	(Requires the DICOM option) Sends the selected image to the <b>DICOM BW Printer Layout</b> page.
<b>Color Print</b>	(Requires the DICOM option) Sends the selected image to the <b>DICOM Color Printer Layout</b> page.
<b>Delete</b>	Removes the selected clip or image from storage.
<b>Options</b>	Accesses a dialog box for enabling simultaneous clip playback and configuring sequential viewing (slide show capability).
<b>Clip Speed</b>	Adjusts the playback speed of all clips in the selected study.
<b>Close Study</b>	Completes the current patient examination and displays the Study screen.
<b>Procedure Screen</b>	(Requires the DICOM option and the DICOM Modality Worklist option) Displays the <b>Choose procedure</b> screen for selection of another procedure for the currently registered patient.  <b>Note:</b> This selection is available when a connected DICOM Worklist server contains multiple procedures for the currently registered patient.

Image Screen Selection	Description
<b>Study Screen</b>	Displays the Study screen.
<b>Live Screen</b>	Exits the Image screen and the Review function; redisplay the real-time imaging screen.
<b>Previous</b>	Displays the previous page of images (including any clips) and automatically selects the last image on that page.
<b>Next</b>	Displays the next page of images (including any clips) and automatically selects the first image on that page.
	Displays the first frame of the selected clip.
	Displays the previous frame of the selected clip.
	Stops playback of the clip.
	Starts playback of the clip.
	Displays the next frame of the selected clip.

## DIMAQ Utility

The system displays the **DIMAQ Utility** screen when you press the **F4** key on the keyboard and then select **DIMAQ Utility** on the left of the **Preset Main Menu**.

### [2] Instructions for Use

Installing  
USB Printers      Ch A4

In the table below, titles of sections are indicated in brackets ([ ]).

Selection	Description
<b>[DIMAQ Utility]</b>	
<b>[HD Defragmentation]</b>	
<b>Defrag Now</b>	Defragments the system's hard disk.
<b>[Printer]</b>	
<b>Install</b>	Installs a USB printer.
<b>Autoprint Images</b>	When enabled (selected), automatically prints stored images to the connected USB printer. The printing occurs when you press the documentation control that stores the image to the system's hard disk.
<b>[CD/DVD]</b>	
<b>Write speed</b>	Specifies the write speed for the CD drive on the ultrasound system.

## Selections for *fourSight* 4D Imaging

**Note:** If the option is not installed on your ultrasound system, the following selections are not available.

### [2] Instructions for Use

*fourSight* 4D  
Imaging

Ch A10

## LCD Selections for *fourSight* 4D Imaging

When you activate *fourSight* 4D imaging, the system displays *fourSight* LCD selections in the **4D** tab (4D LCD).

LCD Selection	Description	Settings
<b>OScan Speed</b>	Changes the rate for scanning.  Use setting <b>3, 4</b> , or <b>5</b> for a continuously updated image of the acquired volume.  Use setting <b>1</b> or <b>2</b> for an updated image of the acquired volume at the end of each sweep.	<b>1, 2, 3, 4, 5</b>
<b>OScan Angle</b>	Changes the angle for scanning.	<b>20, 35, 55, 75</b>
<b>OPause Motion</b>	Temporarily pauses acquisition.	—
<b>OFront Cut</b>	Activates the Front Cut cursor for limiting the displayed volume data.	<b>On, Off</b>
<b>OVOI Control</b>	Displays or hides the VOI (volume of interest).	<b>On, Off</b>
<b>OVOI Type</b>	Selects a shape for the VOI (volume of interest).	<b>Type1, Type2, Type3, Type4, Type5</b>
<b>OMethod</b>	Selects the rendering method.  <b>Sur</b> (Surface): Smoothes image contours, creating a soft, sculptured appearance for highlighting surface features.  <b>Sur1, Sur2, Sur3, Sur4:</b> Optimized versions of Surface.  <b>Max:</b> Limits the display to maximum-value pixels by selecting pixels with the highest value along each projection of the volume. May be helpful in visualizing hypo-echoic lesions and large vascular structures.  <b>Mean:</b> Limits the display to average-value pixels by selecting pixels with the arithmetic mean (average) value along each projection of the volume. Emphasizes volume data with average brightness values and increases translucence.  <b>Min:</b> Limits the display to minimum-value pixels by selecting pixels with the lowest value along each projection of the volume. May be helpful in visualizing hyper-echoic structures and fetal skeletons.	<b>Sur, Sur1, Sur2, Sur3, Sur4, Max, Mean, Min</b>

LCD Selection	Description	Settings
<b>O3D Contrast</b>	Changes the contrast for the volume quadrant only.	<b>0 to 255</b>
<b>O3D Brightness</b>	Changes the brightness for the volume quadrant only.	<b>0 to 255</b>
<b>ONoise Cut</b>	Changes the noise cut setting.	<b>0 to 150</b>
<b>OPenetration</b>	Changes the penetration setting.	<b>0 to 255</b>
<b>OMPR Contrast</b>	Changes the contrast for the MPR quadrants only.	<b>0 to 255</b>
<b>OMPR Brightn.</b>	Changes the brightness for the MPR quadrants only.	<b>0 to 255</b>
<b>ODetail</b>	When enabled, increases the resolution of the volume. When disabled, decreases the resolution of the volume for a smooth, soft appearance.	<b>On, Off</b>
<b>OAuto Tuning</b>	Automatically optimizes the noise setting for the volume.	<b>On, Off</b>
<b>OSmooth Filter</b>	Adjusts the spatial filter, if enabled. A higher setting corresponds to a stronger filter.	<b>0, 1, 2, 3, 4, 5</b>
<b>OVolume</b>	Toggles volume editing with review of volumes in the CINE buffer.	<b>Edit, Cine</b>
<b>OLoad Q.S &gt;&gt;</b>	Displays QuickSet LCD selections for selection and customization of <i>fourSight</i> QuickSets.	---
<b>OAuto View &gt;&gt;</b>	Displays the Auto View LCD selections for automatic rotation.	---
<b>OSave &gt;&gt;</b>	Displays the Save LCD selections for storage of images and volumes.	---
<b>OLayout &gt;&gt;</b>	Displays the Layout LCD selections for 4D imaging.	---
<b>OPalette &gt;&gt;</b>	Displays the Palette LCD selections for 4D imaging.	---
<b>OWireframe</b>	When enabled, outlines the boundaries of the volume in the volume quadrant.	<b>On, Off</b>
<b>OCross Mark</b>	When enabled, displays colored intersection lines on each MPR quadrant and displays magnification and/or rotation symbols on the quadrant(s) assigned to the trackball.	<b>On, Off</b>
<b>OReset All</b>	Restores the default orientation, position, size, and parameter settings for the volume and MPRs from the selected <i>fourSight</i> QuickSet; also removes all edits,	---
<b>OUndo</b>	Removes the most recent edit.	---

## Volume Cine LCD Selections

These selections are displayed when you press the **OVOLUME** key on the 4D LCD to select **CINE**.

Use the system presets to automatically activate Volume Cine when you complete volume acquisition.



**F4**

*fourSight 4D*

► 4D Preference

► ► CINE Control on Freeze

LCD Selection	Description	Settings
<b>OReturn</b>	Redisplays the 4D LCD.	---
<b>OVOLUME</b>	Toggles volume editing with review of volumes in the CINE buffer.	<b>Edit, Cine</b>
<b>OImage Cine</b>	Displays the volume quadrant in full-screen format.	<b>On, Off</b>
<b>OSave Clip</b>	Stores a clip of the volumes in the CINE buffer to the system's hard disk. <b>Note:</b> This selection is available when <b>Image Cine</b> is enabled.	---
<b>OMotion Review</b>	Begins or ends playback of the volumes/images in the CINE buffer.	<b>On, Off</b>
<b>ORate</b>	Changes the playback rate for display of the volumes in the CINE buffer. <b>Note:</b> The settings <b>3/2</b> , <b>2</b> , and <b>4</b> are available during Image Cine only.	<b>1/8, 1/4, 1/2, 3/4, 1, 3/2, 2, 4</b>
<b>OReset Edit</b>	Includes all volumes or images in the CINE buffer for playback.	---
<b>OEdit Start</b>	Selects the currently displayed volume or image as the first volume/image for playback, excluding previous volumes/images in the CINE buffer.	---
<b>OEdit End</b>	Selects the currently displayed volume or image as the last volume/image for playback, excluding later volumes/images in the CINE buffer.	---

## Layout LCD Selections

These selections are displayed when you press the **OLayout >>** key on the 4D LCD.

Use the system presets to specify the initial display format for the volumes and MPRs during and after volume acquisition.



**F4**

*fourSight 4D*

- ▶ Mode Transition Setting
- ▶▶ Initial Mode for High-Speed Motion
- ▶▶ Initial Mode for Low-Speed Motion

LCD Selection	Description
<b>OReturn</b>	Redisplays the 4D LCD.
<b>OA Only</b>	Displays Quadrant A (the acquisition quadrant) in full-screen display format.
<b>OB Only</b>	Displays Quadrant B in full-screen display format.
<b>OC Only</b>	Displays Quadrant C in full-screen display format.
<b>O3D Only</b>	Displays the volume quadrant in full-screen display format.
<b>OA + 3D</b>	Displays Quadrant A (the acquisition quadrant) on the left and the volume quadrant on the right.
<b>O4:1</b>	Displays the volume quadrant and MPR quadrants in equally-sized quadrants, with the volume on the lower-right.
<b>O4:1 (V)</b>	Displays the volume quadrant on the left and the MPR quadrants on the right.
<b>O4:1 (H)</b>	Displays the volume quadrant on the bottom and the MPR quadrants on the top.

## Save LCD Selections

These selections are displayed when you press the **OSave >>** key on the 4D LCD.

Use the system presets to hide or display the toolbar when storing and printing images.



**F4**

- fourSight 4D*
- Hide Toolbar When Saving or Printing

LCD Selection	Description
<b>OReturn</b>	Redisplays the 4D LCD.
<b>OSave Image</b>	Stores an image of the screen to the system's hard disk.
<b>OSave Volume</b>	Stores the currently displayed volume to the system's hard disk.
<b>OSave Volume Cine</b>	Stores the sequence of volumes in the CINE buffer to the system's hard disk.

## Palette LCD Selections

These selections are displayed when you press the **OPalette >>** key on the 4D LCD.

Use the system presets to restore the default list of color schemes and restore the color scheme from the selected *fourSight* QuickSet.



**F4**

- fourSight 4D*
- Default
- Palette

LCD Selection	Description
<b>OReturn</b>	Redisplays the 4D LCD.
<b>OPalette Window</b>	Displays the Palette dialog box for selection and customization of colors used in the image.

## Auto View LCD Selections

These selections are displayed when you press the **OAuto View >>** key on the 4D LCD.

Use the system presets to specify initial settings for automatic rotation.



**F4**

*fourSight 4D*

- ▶ Mode Transition Setting
- ▶▶ Initial Mode for High-Speed Motion
- ▶▶ Initial Mode for Low-Speed Motion

LCD Selection	Description	Settings
<b>OReturn</b>	Redisplays the 4D LCD.	---
<b>OSave Auto View</b>	Stores a clip of the automatic rotation to the system's hard disk.	---
<b>OView Angle</b>	Specifies the view angle used during automatic rotation (Auto View).	<b>1</b> through <b>180</b>
<b>ODirection</b>	Specifies the direction used during automatic rotation (Auto View).	<b>H, H/L, V, V/L</b>
<b>OAngle Step</b>	Specifies the angle step used during automatic rotation (Auto View).	<b>1</b> through <b>45</b>
<b>OAuto View</b>	Begins or ends automatic rotation of the currently displayed volume/image.	---
<b>ODetail</b>	When enabled, increases the resolution of the volume. When disabled, decreases the resolution of the volume for a smooth, soft appearance.	<b>On, Off</b>
<b>O3D Contrast</b>	Changes the contrast for the volume quadrant only.	<b>0</b> to <b>255</b>
<b>ONoise Cut</b>	Changes the noise cut setting.	<b>0</b> to <b>150</b>
<b>OMethod</b>	<p>Selects the rendering method.</p> <p><b>Sur</b> (Surface): Smooths image contours, creating a soft, sculptured appearance for highlighting surface features.</p> <p><b>Sur1, Sur2, Sur3, Sur4:</b> Optimized versions of Surface.</p> <p><b>Max:</b> Limits the display to maximum-value pixels by selecting pixels with the highest value along each projection of the volume. May be helpful in visualizing hypo-echoic lesions and large vascular structures.</p> <p><b>Mean:</b> Limits the display to average-value pixels by selecting pixels with the arithmetic mean (average) value along each projection of the volume. Emphasizes volume data with average brightness values and increases translucence.</p> <p><b>Min:</b> Limits the display to minimum-value pixels by selecting pixels with the lowest value along each projection of the volume. May be helpful in visualizing hyper-echoic structures and fetal skeletons.</p>	<b>Sur, Sur1, Sur2, Sur3, Sur4, Max, Mean, Min</b>
<b>O3D Brightness</b>	Changes the brightness for the volume quadrant only.	<b>0</b> to <b>255</b>
<b>OPenetration</b>	Changes the penetration setting.	<b>0</b> to <b>255</b>



# QuickSet LCD Selections

These selections are displayed when you press the **OQuickSet >>** key on the 4D LCD.
















**[2] Instructions for Use**  
Saving, Retrieving,  
and Deleting  
*fourSight*  
QuickSets Ch A10

















LCD Selection	Description
<b>OReturn</b>	Redisplays the 4D LCD.
<b>O4D QS Screen</b>	Displays the <i>fourSight</i> QuickSet dialog box.
<b>ODefault</b>	Restores the default <i>fourSight</i> QuickSet.







## On-screen Selections for *fourSight* 4D Imaging

### Menu Selections

**Note:** To access selections on another page, roll the trackball to the page indicator (such as **P.2**) and then press the **SET** key.

Icon	Selection	Description
	<b>Pause Motion</b>	Temporarily pauses volume acquisition.
	<b>VOI Control</b>	Displays or hides the VOI (volume of interest).
	<b>QuickSet</b>	Displays the <i>fourSight</i> QuickSet dialog box.
	<b>Save Image</b>	Stores an image of the screen to the system's hard disk.
	<b>Save Volume</b>	Stores the currently displayed volume to the system's hard disk.
	<b>Save Image Cine</b>	Stores a clip of the volumes in the CINE buffer to the system's hard disk.
	<b>Save Volume Cine</b>	Stores the sequence of volumes in the CINE buffer to the system's hard disk.
	<b>Scalpel</b>	Activates the scalpel cursor for editing the displayed volume.
	<b>4:1 (V)</b>	Displays the volume quadrant on the left and the MPR quadrants on the right.
	<b>4:1 (H)</b>	Displays the volume quadrant on the bottom and the MPR quadrants on the top.
	<b>4:1</b>	Displays the volume quadrant and MPR quadrants as equally-sized quadrants, with the volume on the lower-right.
	<b>A Only</b>	Displays Quadrant A (the acquisition quadrant) in full-screen display format.
	<b>B Only</b>	Displays Quadrant B in full-screen display format.
	<b>C Only</b>	Displays Quadrant C in full-screen display format.
	<b>3D Only</b>	Displays the volume quadrant in full-screen display format.

Icon	Selection	Description
	<b>A + 3D</b>	Displays Quadrant A (the acquisition quadrant) on the left and the volume quadrant on the right.
	<b>Reset All</b>	Restores the default orientation, position, size, and parameter settings for the volume and MPRs from the selected <i>fourSight</i> QuickSet; also removes all edits.
	<b>Redo</b>	Restores the most recently removed edit.
	<b>Undo</b>	Removes the most recent edit.
	<b>Volume Cine</b>	Displays all volumes stored in the CINE buffer.
	<b>Image Cine</b>	Displays the volume quadrant in full-screen format.
	<b>Cine (Image/Volume) Motion Review</b>	Begins or ends playback of the volumes/images in the CINE buffer.
	<b>Auto View H</b>	Selects horizontal (right) motion for automatic rotation of the currently displayed volume/image.
	<b>Auto View H/L</b>	Selects horizontal (left and right) motion for automatic rotation of the currently displayed volume/image.
	<b>Auto View</b>	Begins or ends automatic rotation of the currently displayed volume/image.
	<b>Auto View V</b>	Selects vertical motion (down) for automatic rotation of the currently displayed volume/image.
	<b>Auto View V/L</b>	Selects vertical (up and down) motion for automatic rotation of the currently displayed volume/image.
	<b>Auto View Save</b>	Stores a clip of the automatic rotation to the system's hard disk.
	<b>Wireframe</b>	When enabled, outlines the boundaries of the volume in the volume quadrant.
	<b>Cross Mark</b>	When enabled, displays colored intersection lines on each MPR quadrant and displays applicable trackball arbitration symbols on quadrants.
	<b>Palette</b>	Displays the Palette dialog box for selection and customization of colors used in the image.

Icon	Selection	Description
	<b>Remove Edits</b>	Removes all Scalpel and Scalpel Ellipse edits.
	<b>Reset Position</b>	Restores the default position of the volume and MPRs.
	<b>Reset Orientation</b>	Restores the default orientation of the volume and MPRs.
	<b>Reset Zoom</b>	Restores the default size of the volume and MPRs.
	<b>Reset Brightness/Contrast</b>	Restores the brightness and contrast settings for the volume and MPRs from the selected <i>fourSight</i> QuickSet.
	<b>Reset Noise Cut/Penetration</b>	Restores the noise cut and penetration settings for the volume and MPRs from the selected <i>fourSight</i> QuickSet.

## ***fourSight* QuickSet Dialog Box**

The system displays the *fourSight* QuickSet dialog box when you select the **QuickSet** icon on the left of the screen or when you press the **OLoad Q.S >>** key on the 4D LCD and then press the **O4D QS Screen** key.

**Note:** The *fourSight* QuickSet Dialog Box lists the 4D imaging QuickSets only. It does not display QuickSets created using the **F8** key.

Selection	Description
<b>4D QuickSet</b>	Lists the 4D imaging QuickSets.
<b>Enable</b>	Activates (retrieves) the selected <i>fourSight</i> QuickSet.
<b>Delete</b>	Removes the selected <i>fourSight</i> QuickSet.
<b>Up</b>	Repositions the selected <i>fourSight</i> QuickSet one item higher on the list.
<b>Down</b>	Repositions the selected <i>fourSight</i> QuickSet one item lower on the list.
<b>Exit</b>	Exits the dialog box.
<b>Name</b>	(Text box for user entry.)
<b>New</b>	Saves the current settings as a <i>fourSight</i> QuickSet.

## **Palette Dialog Box**

The system displays the Palette dialog box when you select the **Palette** icon on the left of the screen or when you press the **OPalette >>** key on the 4D LCD and then press the **OPalette Window** key.

Selection	Description
<b>Page</b>	Displays the color schemes in the selected page.
<b>Up</b>	Repositions the selected color scheme one item higher on the list.
<b>Down</b>	Repositions the selected color scheme one item lower on the list.
<b>OK</b>	Saves the changes and exits the dialog box.
<b>Cancel</b>	Exits the dialog box without saving changes.
<b>Edit</b>	Displays a dialog box for customizing the selected color scheme.

## Edit Palette Dialog Box

The system displays the **Edit Palette** dialog box when you select the **Edit** button in the Palette dialog box.

Selection	Description
<b>Adjust Color</b>	(Heading [title] for a group of menu items.)
<b>Multi</b>	Includes a color range in the selected color scheme.
<b>Single</b>	Includes only one color in the selected color scheme.
<b>Highlight</b>	Displays a dialog box for customizing the highlight of the color range. Available for color ranges only.
<b>Mid-range</b>	Displays a dialog box for customizing the mid-range of the color range.
<b>Shadows</b>	Displays a dialog box for customizing the shadows of the color range. Available for color ranges only.
<b>Palette Name</b>	(Text box for user entry.)
<b>Save</b>	Saves the changes and exits the dialog box.
<b>Cancel</b>	Exits the dialog box without saving changes.

## Color Definition Dialog Box

The system displays the Color Definition dialog box when you select the **Highlight**, **Mid-range**, or **Shadows** button on the **Edit Palette** dialog box.

Selection	Description
<b>Basic colors</b>	(Heading [title] for a group of menu items.) Lists color buttons for changing the selected color.
<b>Custom colors</b>	Lists color buttons for user-defined colors.
<b>Hue</b>	Displays the current (editable) value for the color's hue.
<b>Sat</b>	Displays the current (editable) value for the color's saturation.
<b>Lum</b>	Displays the current (editable) value for the color's luminance.
<b>Red</b>	Displays the current (editable) red value for the color.
<b>Green</b>	Displays the current (editable) green value for the color.
<b>Blue</b>	Displays the current (editable) blue value for the color.
<b>Add to Custom Colors</b>	Saves the current color settings to the list of user-defined colors.
<b>OK</b>	Saves the changes and exits the dialog box.
<b>Cancel</b>	Exits the dialog box without saving changes.

## Volume Toolbar Icon Selections

The system displays the volume toolbar when you position the cursor on the volume.

**Note:** Indented selections in this table represent additional icons that you can display on the toolbar. To display additional icons on the toolbar, roll the trackball to position the cursor on an icon and then press the **UPDATE** key on the control panel. For example, to display the **Undo Scalpel** icon, roll the trackball to position the cursor on the **Scalpel** icon and then press the **UPDATE** key on the control panel.

Use the system presets to customize the toolbar.




















**F4**

*fourSight 4D*











► Toolbar Setting

►► 3D

Icon	Selection	Description
	<b>Brightness/ Contrast</b>	Changes the brightness or contrast. Vertical motion of the trackball changes brightness. Horizontal motion of the trackball changes contrast.
	<b>Front Cut</b>	Defines the cut plane (for removal of volume data) on the acquisition quadrant.
	<b>Bubble Clip</b>	Removes volume data outside the user-placed elliptical boundaries.
	<b>Box Clip</b>	Defines the cut plane (for removal of volume data) on the volume quadrant, using the selected planes. (This selection is displayed on the subtoolbar for the <b>Front Cut</b> and <b>Bubble Clip</b> icons.)
	<b>Niche Clip</b>	Defines the cut plane (for removal of volume data) on the volume quadrant, using the selected planes, in the selected size. (This selection is displayed on the subtoolbar for the <b>Front Cut</b> and <b>Bubble Clip</b> icons.)
	<b>Reset All</b>	Restores the default orientation, position, size, and parameter settings for the volume and MPRs from the selected <i>fourSight</i> QuickSet; also removes all edits,
	<b>Reset Brightness/ Contrast</b>	Restores the brightness and contrast settings for the volume and MPRs from the selected <i>fourSight</i> QuickSet.
	<b>Reset Noise Cut/ Penetration</b>	Restores the noise cut and penetration settings for the volume and MPRs from the selected <i>fourSight</i> QuickSet.
	<b>Remove Edits</b>	Removes all Scalpel and Scalpel Ellipse edits.
	<b>Reset Orientation</b>	Restores the default orientation of the volume and MPRs.
	<b>Reset Position</b>	Restores the default position of the volume and MPRs.
	<b>Reset Zoom</b>	Restores the default size of the volume and MPRs.

Icon	Selection	Description
	<b>Noise Cut/ Penetration</b>	Changes the noise cut setting or the penetration setting. Vertical motion of the trackball changes the noise cut setting. Horizontal motion of the trackball changes the penetration setting.
	<b>Detail</b>	When enabled, increases the resolution of the volume. When disabled, decreases the resolution of the volume for a smooth, soft appearance.
		
	<b>Auto Tuning</b>	Automatically optimizes the noise setting for the volume.
		
	<b>Smooth Filter 1</b>	Indicates the current spatial filter setting. When selected, cycles to the next available spatial filter setting.
	<b>Smooth Filter 2</b>	Indicates the current spatial filter setting. When selected, cycles to the next available spatial filter setting.
	<b>Smooth Filter 3</b>	Indicates the current spatial filter setting. When selected, cycles to the next available spatial filter setting.
	<b>Smooth Filter 4</b>	Indicates the current spatial filter setting. When selected, cycles to the next available spatial filter setting.
	<b>Smooth Filter 5</b>	Indicates the current spatial filter setting. When selected, cycles to the next available spatial filter setting.
	<b>Smooth Filter OFF</b>	Indicates that the spatial filter is disabled. When selected, cycles to the next available spatial filter setting.
	<b>Move Volume</b>	Pans (shifts) the volume data set within the volume quadrant.
	<b>Zoom</b>	Activates volume magnification.
	<b>Back and Forth Move</b>	Steps through the volume.
	<b>Scalpel</b>	Draws a freeform shape around volume data for removal.
	<b>Undo Scalpel</b>	Draws a freeform shape for restoration of removed data.
	<b>Scalpel Ellipse</b>	Selects an ellipses-shaped area of volume data for removal.



Icon	Selection	Description
	<b>Undo Scalpel Ellipse</b>	Selects an ellipses-shaped area of volume data for restoration of removed data.
	<b>Scalpel By Clip</b>	Activate Front Cut or Bubble Clip ROI placement by removing image data above the front cut plane or by removing data outside of the ellipse.
	<b>Surface</b>	Activates the Surface rendering method when selected from the subtoolbar. When displayed on the toolbar, indicates the currently selected rendering method.
	<b>Surface 1</b>	Activates the Surface 1 rendering method when selected from the subtoolbar. When displayed on the toolbar, indicates the currently selected rendering method.
	<b>Surface 2</b>	Activates the Surface 2 rendering method when selected from the subtoolbar. When displayed on the toolbar, indicates the currently selected rendering method.
	<b>Surface 3</b>	Activates the Surface 3 rendering method when selected from the subtoolbar. When displayed on the toolbar, indicates the currently selected rendering method.
	<b>Surface 4</b>	Activates the Surface 4 rendering method when selected from the subtoolbar. When displayed on the toolbar, indicates the currently selected rendering method.
	<b>Max</b>	Activates the Maximum Intensity Projection rendering method when selected from the subtoolbar. When displayed on the toolbar, indicates the currently selected rendering method.
	<b>Min</b>	Activates the Minimum Intensity Projection rendering method when selected from the subtoolbar. When displayed on the toolbar, indicates the currently selected rendering method.
	<b>Mean</b>	Activates the Mean Intensity Projection rendering method when selected from the subtoolbar. When displayed on the toolbar, indicates the currently selected rendering method.

## MPR Toolbar Icon Selections

The system displays the MPR toolbar when you position the cursor on an MPR.

**Note:** Indented selections in this table represent additional icons that you can display on the toolbar. To display additional icons on the toolbar, roll the trackball to position the cursor on an icon and then press the **UPDATE** key on the control panel. For example, to display the **Undo Scalpel** icon, roll the trackball to position the cursor on the **Scalpel** icon and then press the **UPDATE** key on the control panel.

Use the system presets to customize the toolbar.













**F4**

fourSight 4D

► Toolbar Setting

►► MPR

Icon	Selection	Description
	<b>Brightness/ Contrast</b>	Changes the brightness or contrast. Vertical motion of the trackball changes brightness. Horizontal motion of the trackball changes contrast.
	<b>Front Cut</b>	Defines the cut plane (for removal of volume data) on the acquisition quadrant.
	<b>Bubble Clip</b>	Removes volume data outside the user-placed elliptical boundaries.
	<b>Box Clip</b>	Defines the cut plane (for removal of volume data) on the volume quadrant, using the selected planes. (This selection is displayed on the subtoolbar for the <b>Front Cut</b> and <b>Bubble Clip</b> icons.)
	<b>Niche Clip</b>	Defines the cut plane (for removal of volume data) on the volume quadrant, using the selected planes, in the selected size. (This selection is displayed on the subtoolbar for the <b>Front Cut</b> and <b>Bubble Clip</b> icons.)
	<b>Scalpel</b>	Draws a freeform shape around volume data for removal.
	<b>Undo Scalpel</b>	Draws a freeform shape for restoration of removed data.
	<b>Scalpel Ellipse</b>	Selects an ellipses-shaped area of volume data for removal.
	<b>Undo Scalpel Ellipse</b>	Selects an ellipses-shaped area of volume data for restoration of removed data.
	<b>Scalpel By Clip</b>	Activate Front Cut or Bubble Clip ROI placement by removing image data above the front cut plane or by removing data outside of the ellipse.

Icon	Selection	Description
	<b>Rotate around vertical axis (L/R)</b>	Rotates the volume around the vertical axis.
	<b>Rotate around horizontal axis (U/D)</b>	Rotates the volume around the horizontal axis.
	<b>Zoom</b>	Activates MPR magnification.
	<b>Reset All</b>	Restores the default orientation, position, size, and parameter settings for the volume and MPRs from the selected <i>fourSight</i> QuickSet; also removes all edits,
	<b>Reset Brightness/Contrast</b>	Restores the brightness and contrast settings for the volume and MPRs from the selected <i>fourSight</i> QuickSet.
	<b>Reset Noise Cut/Penetration</b>	Restores the noise cut and penetration settings for the volume and MPRs from the selected <i>fourSight</i> QuickSet.
	<b>Remove Edits</b>	Removes all Scalpel and Scalpel Ellipse edits.
	<b>Reset Orientation</b>	Restores the default orientation of the volume and MPRs.
	<b>Reset Position</b>	Restores the default position of the volume and MPRs.
	<b>Reset Zoom</b>	Restores the default size of the volume and MPRs.

## DICOM Screen Selections

The following descriptions for the Study, Image, and DICOM screens are specific to the DICOM Connectivity option. DIMAQ-IP Study and Image screen selections are also available for use with this option.

### System Reference

Study Screen	Ch 5
Image Screen	Ch 5

In the **Network** section of the Study screen, the system indicates the connection status (for example: **Ping OK**).

**Note:** If the option is not installed on your ultrasound system, the following selections are not available.

## Study Screen

Study Screen Selections	Description
<b>Screen</b>	
<b>DICOM Screen</b>	Displays the DICOM screen for access to printer layout pages and print and store queues.
<b>Worklist Screen</b>	(Requires the DICOM 3.0 connectivity option): Displays the <b>Worklist</b> screen for automatic entry of patient data on the <b>New Patient Data</b> form. Systems with the Worklist option installed and the Worklist server configured display a <b>Worklist</b> button on the screen.
<b>Procedure Screen</b>	Displays the <b>Choose procedure</b> screen for selection of another procedure for the currently registered patient.  <b>Note:</b> This selection is available when a connected DICOM Worklist server contains multiple procedures for the currently registered patient.
<b>Network</b>	
<b>Send</b>	Copies the images from the selected study to the destination selected from the drop-down list.
(drop-down list)	Lists the available destinations, such as printers and servers.

## Image Screen

To the right of each print selection (such as **BW Print**), the system indicates the number of images on the printer layout page and the number of images required to fill the page. For example, "1/4" indicates that one image has been sent to the printer layout page and that four images are required to fill the layout page.

Image Screen Selections	Description
<b>BW Print</b>	Sends the selected image or clip frame to the <b>DICOM BW Printer Layout</b> page.
<b>Color Print</b>	Sends the selected image or clip frame to the <b>DICOM Color Printer Layout</b> page.

## DICOM Screen

The DICOM screen displays layout pages for the black and white and color printers and queue status pages for the DICOM print and store functions.

### Printer Layout Pages

Page tabs displayed along the top of the DICOM screen include:

- **DICOM BW Printer Layout**
- **DICOM Color Printer Layout**

The selections available for the printer layout pages are described below. The system also lists the following settings at the top of each page: setup alias, film size, number of copies, and film orientation (Portrait or Landscape); these settings are only selectable in the system presets.

The system indicates the current page number and the total number of pages on the upper right of the screen. For example, "1/2" indicates that the system is displaying the first of two pages.



**F4**

DICOM

► Color Printer

► Black and  
White Printer

Selection	Description
<b>Delete</b>	Removes the image outlined in green from the layout page.
<b>Cut</b>	Marks the image outlined in green for rearranging. The image outline changes to yellow.
<b>Paste</b>	First select a new image as the paste location. The paste location image outline changes to blue. Then select the <b>Paste</b> button to insert the cut image in place of the image outlined in blue.
<b>1x1      3x3</b>	Identifies the columns and rows needed to assemble a full page of print images. This setting ( <b>Display Layout</b> ) is selected separately in the system presets for each type of printer and cannot be changed from a layout page.
<b>1x2      3x5</b>	
<b>2x2      4x5</b>	
<b>2x3      4x6</b>	
<b>3x2      5x6</b>	
<b>Print Page</b>	Sends the current page of images to the <b>DICOM Print Queue</b> . The <b>Display Layout</b> requirements do not need to be filled to print the page.
<b>Print All Pages</b>	Sends all pages of images to the <b>DICOM Print Queue</b> .
<b>Back</b>	Displays the Study screen.
<b>Change</b>	Displays a dialog box for change of printer selection, film size, number of copies, and print orientation.
<b>Previous</b>	Displays the preceding page of print images. Not available if no preceding page exists.
<b>Next</b>	Displays the next page of print images. Not available if no following page exists.

Print and Store Queues

Page tabs displayed along the top of the DICOM screen include:

- DICOM Print Queue
- DICOM Store Queue

The system lists the following items for each queue entry on the **DICOM Print Queue** page.



<b>F4</b>
DICOM
▶ Black and White Printer
▶▶ Write Timeout in Seconds
▶ Color Printer
▶▶ Write Timeout in Seconds

<b>System Reference</b>
Queue Status Indicators
Ch 6

Item	Description
Patient Name	Patient name.
Printer	AE Title of printer.
Time Sent	Time at which the entry was sent.
No of Copies	Number of copies.
No of Sheets	Number of pages.
Status	Queue status indicator.
Details	Error description.

The system lists the following items for each queue entry on the **DICOM Store Queue** page.

Item	Description
<b>Type</b>	Type of operation: <ul style="list-style-type: none"> <li>▪ <b>Store</b> (storage)</li> <li>▪ <b>Commit</b> (storage commitment)</li> <li>▪ <b>Mpps</b> (Modality Performed Procedure Step, or MPPS)</li> </ul>
<b>Patient Name</b>	Patient name.
<b>Server</b>	AE Title of server.
<b>Time Sent</b>	Time at which the entry was sent.
<b>MBytes</b>	For storage operations, indicates size of entry.
<b>State</b>	For storage operations, indicates archive status: <ul style="list-style-type: none"> <li>▪ <b>None</b></li> <li>▪ <b>Stored</b></li> <li>▪ <b>Committed</b></li> </ul> For Modality Performed Procedure Step (MPPS) operations, indicates step state: <ul style="list-style-type: none"> <li>▪ <b>Completed</b></li> <li>▪ <b>Discontinued</b></li> <li>▪ <b>In Progress</b></li> </ul>
<b>Status</b>	Queue status indicator.
<b>Details</b>	Error description.

The selections available for the print and store queue pages are described below.

Selection	Description
<b>Refresh Queue</b>	Updates the status of each entry in the queue.
<b>Delete Job</b>	Deletes the highlighted queue entry. You can select and delete multiple queue entries.
<b>Back</b>	Displays the Study screen.
<b>Retry Job</b>	Attempts to resend the selected queue entry.





## 4 System Setup

---

<b>Initial Setup.....</b>	<b>3</b>
Daily Checklist .....	3
System Review .....	4
<b>Moving the System .....</b>	<b>7</b>
Swivel Locking Brake .....	7
Prior to the Move .....	8
During the Move .....	8
Shipping the System .....	9
After the Move .....	9
<b>System Startup.....</b>	<b>10</b>
Plugging in the System.....	10
Supplying Power to the System .....	11
Adjusting Controls on the Monitor.....	12
Testing the Monitor.....	14
Degaussing the Monitor .....	14
Adjusting Controls on the LCD .....	15
Audio Volume.....	15
Connecting and Disconnecting Transducers.....	16
Protective Transducer Holder.....	17
Array Transducers .....	19
Specialty Array Transducers .....	20
Continuous Wave Transducers.....	21
Connecting System Accessories .....	22
Footswitch .....	22
ECG (EKG) Cables .....	22
External ECG .....	22
Input/Output Panel Connections .....	23

<b>System Ergonomics .....</b>	<b>28</b>
<b>General System Settings.....</b>	<b>29</b>
Modifying Hospital or Clinic Name .....	29
Setting System Date and Time.....	30
<b>Software Installation.....</b>	<b>32</b>
Installing and Reinstalling System Software.....	33
<b>Software-Based Option Installation .....</b>	<b>35</b>

## Initial Setup


The ultrasound system is initially unpacked and installed by a Siemens representative. Your Siemens representative will verify the operation of the system. Any transducers, documentation and storage devices, accessories, and options delivered with your system are also connected and installed for you.

Each day before you use the ultrasound system, perform the Daily Checklist procedures described below.

## Daily Checklist

### Perform the following each day before using the ultrasound system:

- ☐ Visually inspect all transducers. Do not use a transducer with a cracked, punctured, or discolored casing, or a frayed cable.

 **WARNING:** To avoid electrical shock, you must visually inspect a transducer prior to use. Do not use a transducer that has a cracked, punctured, or discolored casing or a frayed cable.

**Discoloration Exception:** The use of the approved disinfectants, Cidex OPA and Gigasept FF, may cause discoloration of transducer housings, including the face of the transducer. You can continue to use a transducer if it is discolored due to the use of these specific disinfectants only.

- ☐ Visually inspect all power cords. Do not turn on the power if a cord is frayed or split, or shows signs of wear.

If your system's power cord is frayed or split, or shows signs of wear, contact your Siemens service representative for power cord replacement.

- ☐ Verify that the trackball, DGC slide controls, and other controls on the control panel and LCD are clean and free from gel or other contaminants.

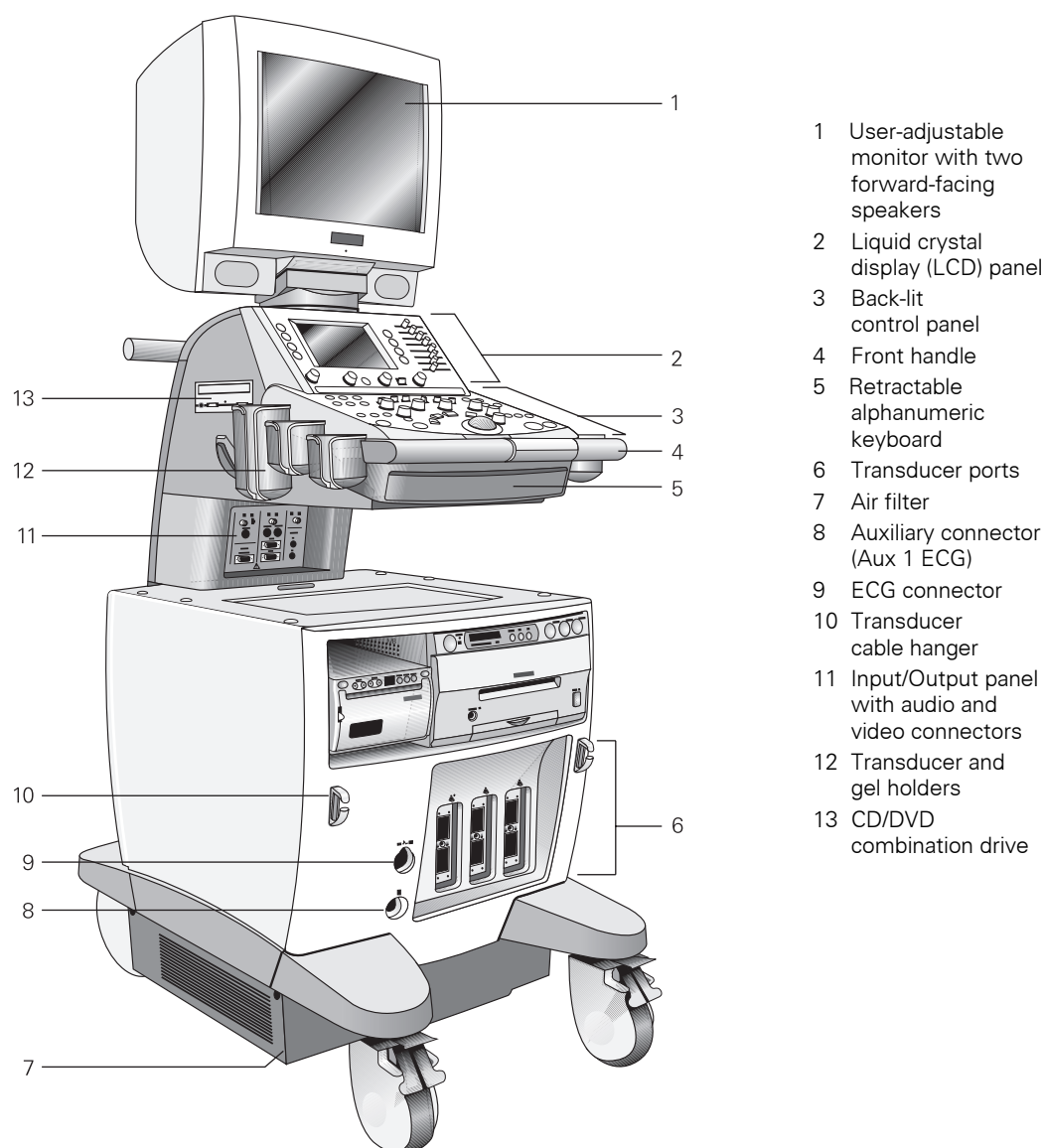
### Once the system is powered on:

- ☐ Visually check the on-screen displays and lighting.
- ☐ Verify that the monitor displays the current date and time.
- ☐ Verify that the transducer identification and indicated frequency are correct for the active transducer.

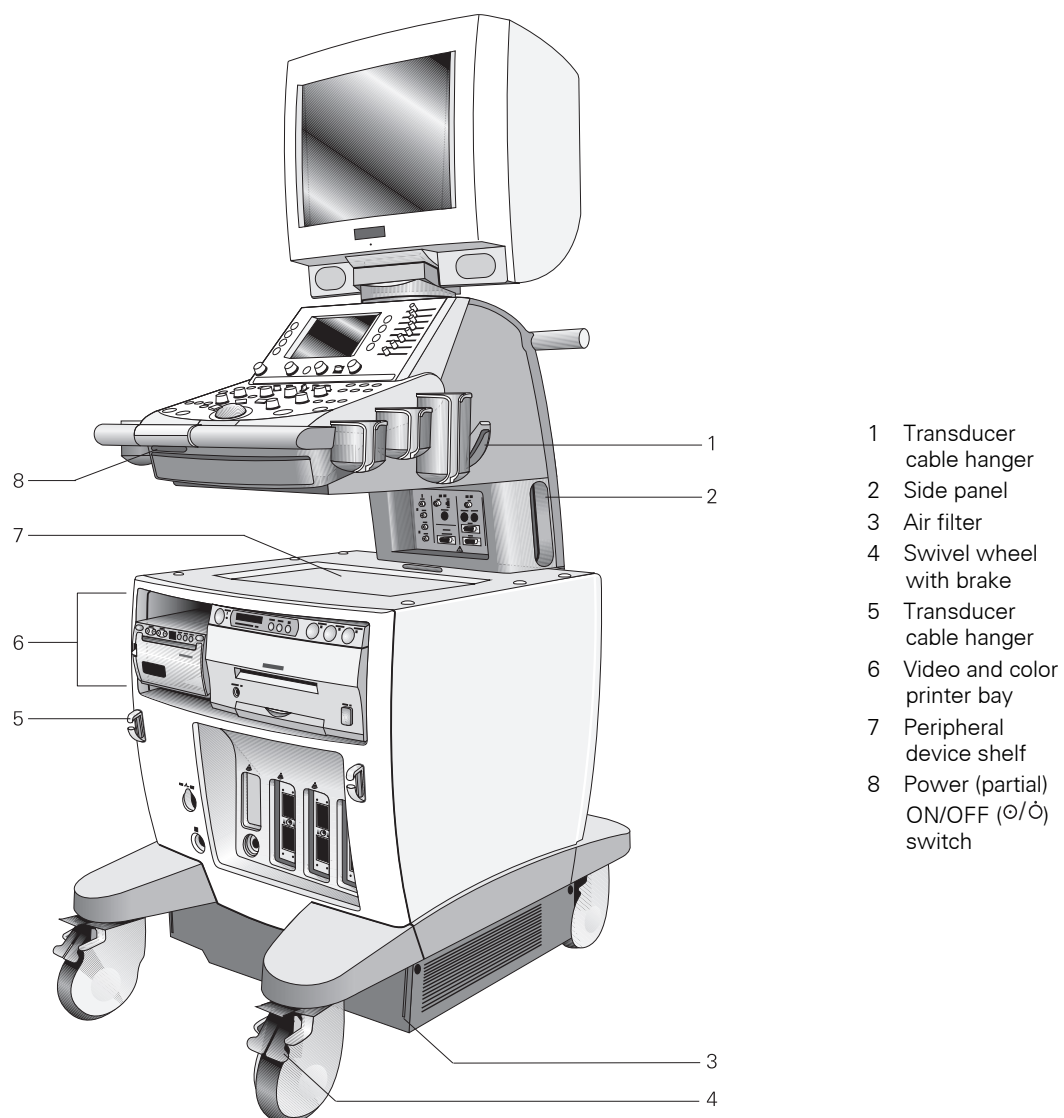
### [1] Instructions for Use

Approved List  
of Disinfectants Ch 2

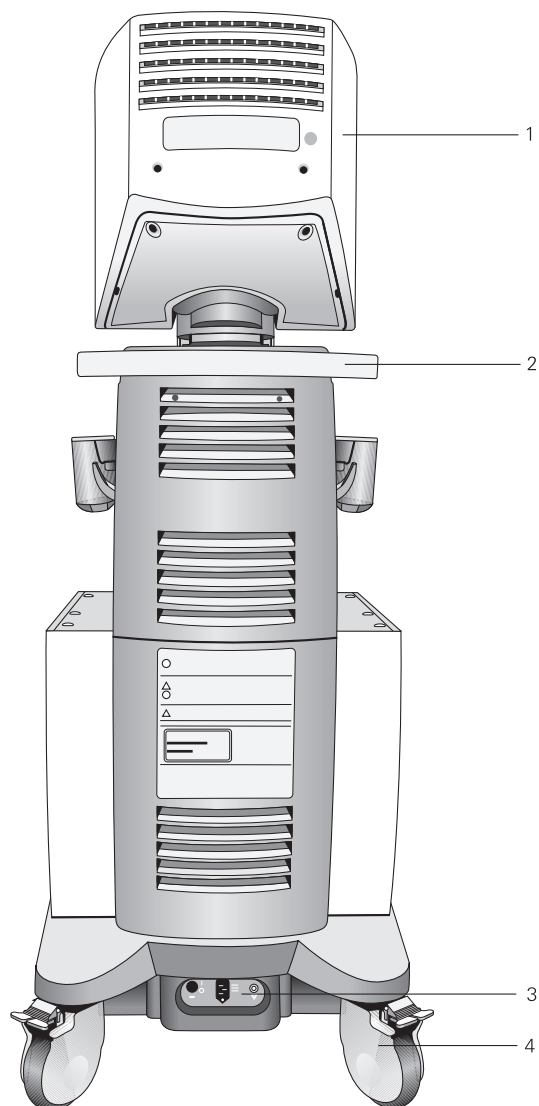
## System Review



*Example of the ultrasound system, left front view.*



*Example of the ultrasound system, right front view.*



- 1 Monitor
- 2 Rear handle
- 3 Power panel with  
circuit breaker
- 4 Swivel wheel  
with brake

*Example of the ultrasound system, back view.*

## Moving the System

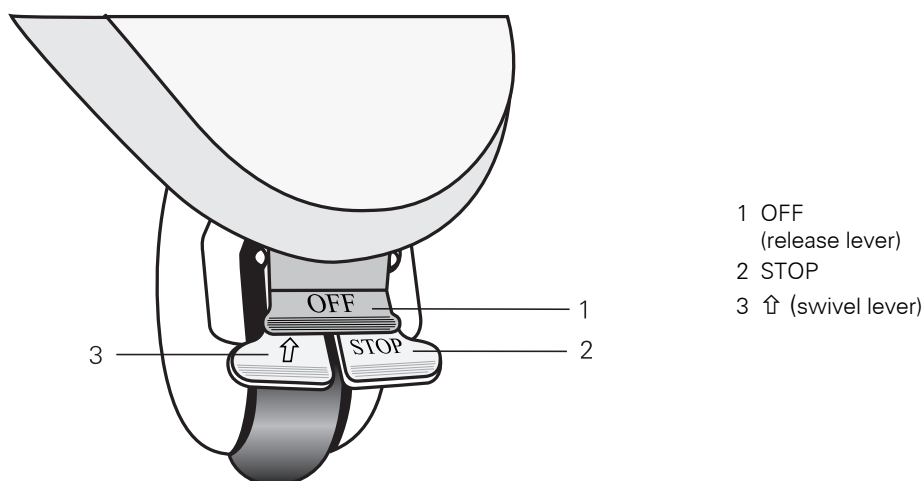
**⚠ Caution:** Preparations before moving the system are important to minimize potential damage to sensitive components and to avoid safety hazards. Review the moving instructions before moving the system.

**⚠ Caution:** Do not park, or leave unattended, on a slope. Even when the rear brakes are engaged, the system may slide down a ramp.

The ultrasound system is designed to be a mobile unit. Before moving the system to another location, you must prepare for the move by powering off and securing the system.

### Swivel Locking Brake

The ultrasound system has four swivel locking brakes. Each brake has a locking lever, a swivel lever, and a release lever. Set the swivel locking brakes with the levers on each wheel.



*Example of wheel with locking brake (unlocked).*

#### To lock the brake:

- Using your foot, press the "STOP" lever into the lowest position (locked).

#### To release the brakes:

- Using your foot, press the "OFF" lever to release the brake.

#### To lock the swivel:

- Press the lever labeled "↑" with your foot until the swivel brake locks into place.


#### To release the swivel:


- Press the lever labeled "OFF" with your foot until the brake unlocks and the lever labeled "↑" releases.


## Prior to the Move

1. Power off (⏻) the ultrasound system. The power (partial) on/off (⏻/⏻) switch is located on the left front of the control panel.
2. Unplug the power cord from the wall outlet. Pull on the plug, not the cord.
3. Secure the power cord to avoid rolling the system wheels over the cord.
4. To ensure that the transducers are transported safely, remove each transducer and place it in its protective carrying case.
5. Push the keyboard under the control panel.
6. Disconnect off-board documentation devices from the system.
7. Transport gel, video tapes, and CD-R disks separately.
8. Disconnect the optional footswitch.
9. Release both the front and rear brakes.

## During the Move

 **Caution:** When moving the ultrasound system, protect it from environmental changes including: moisture, winds, dirt and dust, and extreme heat or cold exposure.

 **Caution:** Avoid moving the ultrasound system on outside surfaces with loose dirt, contaminants, or standing liquids.

 **Caution:** Care should be taken to minimize shock and vibration of the ultrasound system. Avoid uneven surfaces that contain an abrupt height change or jarring surface irregularities.

You can move the ultrasound system from room to room within a facility and easily reposition the system during an examination. Be careful on inclines and uneven surfaces. The ultrasound system can be moved across pavement and other hardened parking lot surfaces.

**Note:** The wheels of the ultrasound system must be locked when transporting by vehicle. The ultrasound system must be sufficiently anchored to the vehicle floor or walls such that it does not shift or move during transport.

### [1] Instructions for Use

Power Off	4-11
Transducer Care	Ch 2



# Shipping the System

When shipping the system, perform the following tasks, as appropriate.

## To prepare the system for shipment over long distances or rough terrain:

- 1. Repack the system in the factory packaging and crate.
- 2. Load the system into a vehicle using a lift gate.  
  
To prevent lateral movement of the system, secure the system with cargo straps.  
  
To prevent sudden jarring of the system during transport, provide shock cushions beneath the system.

## After the Move

- ⚠ **Caution:** Make sure the ultrasound system has proper ventilation during operation. Do not position the system against walls or hard surfaces that would impede free ventilation around the system.
  - ⚠ **Caution:** Do not allow linens, bedding, and/or hanging curtain partitions to block the ultrasound system's ventilation.
  - ⚠ **Caution:** Obstructed fans can cause potential system overheating, system performance degradation, or failure.
  - ⚠ **Caution:** Brakes are most effective on a level surface. Never park the system on an incline greater than five degrees.
- 1. Position the system: Make sure the system is not placed against walls or fabrics that obstruct perimeter air flow to the system cooling fans.
  - 2. Set the brakes: Set the front and rear brakes.
  - 3. Plug in the cord: Plug the power cord into a hospital-grade or local equivalent wall outlet.
  - 4. Power ON: Power on (⊙) the ultrasound system.
  - 5. Check the display: After the boot-up sequence is complete, verify that the image display is stable, that you can select a transducer, and that the system responds to selections made on the control panel.

[1] Instructions for Use	
Daily Checklist	4-3
Brakes	4-7

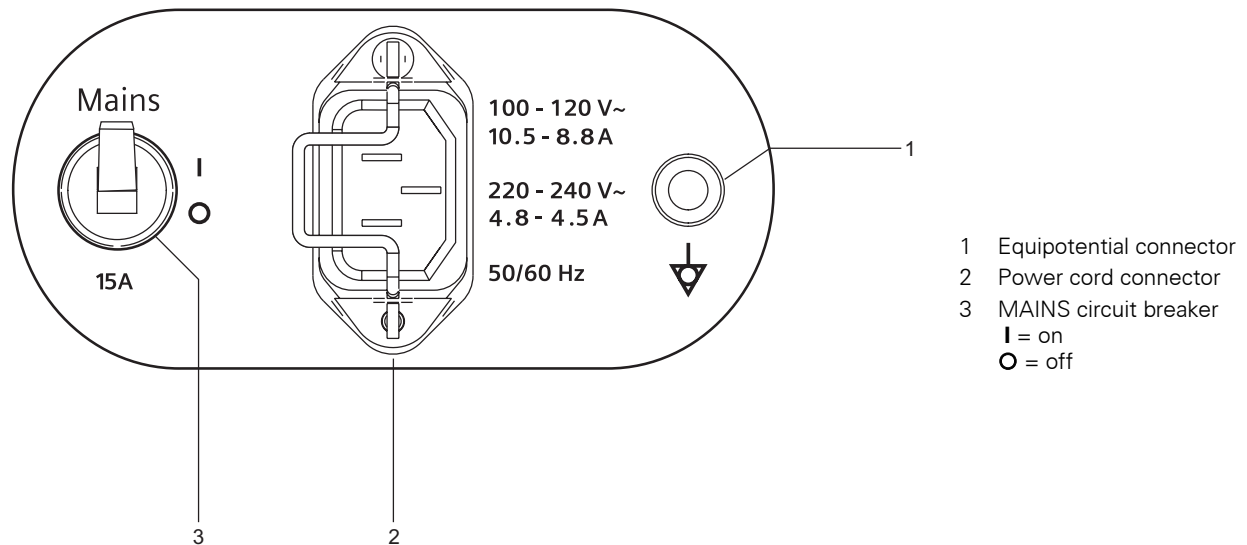
## System Startup

The first step to operating the ultrasound system is to connect the system to a power source.

### Plugging in the System

The ultrasound system has a detachable power cord. Ensure that the power cord is connected to the system before connecting the cord to the power source.

**⚠ WARNING:** For systems used in the U.S.A.: to ensure grounding reliability, connect the system only to a hospital-grade power receptacle.



*Example of power panel.*


#### To plug in the system:

- Connect the power cord to the MAINS supply:
  - 220V~ to 240V~ systems: connect the power cord to a standard MAINS receptacle. For example, a "Schuko" receptacle (CEE 7-7 standard).
  - 100V~ to 120V~ systems used in the U.S.A.: connect the power cord to a hospital-grade MAINS receptacle.
  - 100V~ to 120V~ systems outside the U.S.A.: connect the power cord to a standard MAINS receptacle.

# Supplying Power to the System

The ultrasound system is powered on and off using the green partial power on/off (☉/⦿) switch located on the left front of the control panel.

**Note:** This switch does not completely shut down or disconnect the system from the power mains. This switch only powers on, or off, a portion of the ultrasound system. To completely disconnect the system from the power mains, the circuit breaker located on the back panel must be switched from **I** to **O**.

 **Caution:** Wait approximately 20 seconds between powering the system off and then on again. This allows the system to complete its shutdown sequence.

## To power on the system:

- 1. Before using the system, perform the Daily Checklist.
- 2. Verify the power cord is plugged into the system and then into the power supply.
- 3. Power on (☉) the ultrasound system.

When powered on, the system runs through a series of self-diagnostic and calibration tests. The tests last a few minutes, after which the system is ready for use.

**Note:** The system will not run through the complete power-on routine if a problem occurs. Instead, an error code or message appears on the screen to indicate the problem. Please note the message and call your local Siemens service representative.

The system is factory-configured to display initially in 2D-mode.

- 4. Visually check the on-screen displays and lighting indicated in the Daily Checklist.

## To power off the system:

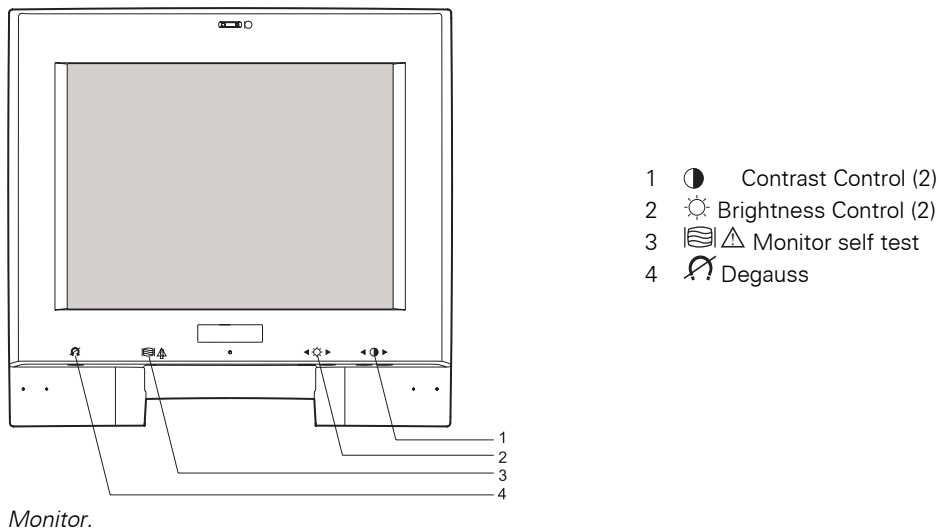
- Power off (⦿) the ultrasound system.

Wait approximately 20 seconds before powering on (☉) the ultrasound system.

**Note:** If the C6-3 3D/C6F3 transducer has been operating for longer than 90 minutes, the system performs a routine maintenance of the transducer prior to powering off. A message displays on-screen during this procedure.

[1] Instructions for Use	
Daily Checklist	4-3

## Adjusting Controls on the Monitor



**Note:** Factory-defined imaging presets were created using default settings of the brightness and contrast controls of the monitor. Adjusting the brightness and contrast controls on the monitor may affect the image optimization intended by the factory-defined imaging presets.

For consistency in image reproduction, adjustments to the brightness and contrast of the viewing monitor should be made prior to adjusting the print quality of installed documentation devices.

### To adjust the brightness or contrast control for the monitor:

**Note:** Always begin adjusting your monitor with the controls set to the factory defaults, and then adjust each control separately to suit your preference and the lighting conditions in the room.

- Press the right contrast button to increase the display contrast. Press the left button to decrease the contrast.
- Press the right brightness button for a brighter image with a lighter background. Press the left button for a darker image.

**To restore and lock the factory default monitor settings for brightness and contrast:**

1. Simultaneously press the two Brightness buttons (☀️) located on the right front underside of the monitor.  
The system restores the factory default setting of 32% for Brightness.
2. Simultaneously press the two Contrast buttons (🎯) located to the right of the Brightness buttons.  
The system restores the factory default setting of 86% for Contrast.
3. Press and hold the Degauss button (🌀) for 15 seconds or until the system displays a notification message. The button is located on the left front underside of the monitor.

The message notifies you that the 'OSD Main Menu is locked'.

**Note:** To unlock the monitor settings, repeat step 3 above.

This process assures consistent quality in the image display and reduces the potential for image quality issues.

## Testing the Monitor

If you suspect monitor-specific problems, you can activate the monitor self test for confirmation. This test displays patterns on the screen. The patterns are separate from the system video. The patterns display in the following order:

- Cross-hatch pattern (#1): seven lines of white consecutive dashes, each alternating with a line of white vertical bars, on a black background.
- Black test pattern (#2): "BLACK" in white letters on a black background.
- White test pattern (#3): "WHITE" in black letters on a white background.
- Color-bar test pattern (#4): four vertical bars, labeled (from left to right) "W" for white, "R" for red, "G" for green, and "B" for blue.

### To test the monitor:

1. Press the Monitor self test button located on the underside of the monitor with the tip of a pen or a paper clip.

The green monitor LED (under the Siemens logo) blinks and the first test pattern in the sequence displays on the screen.

2. Observe the cross-hatch display and note any differences from the correct display described above.
3. Press the Degauss button located on the underside of the monitor to scroll through each test pattern in the sequence. Compare each test pattern with the correct display (described above) and note any differences, such as missing colors or geometric distortions. When you press the Degauss button the fourth time, the monitor self test automatically exits and the green monitor LED (under the Siemens logo) stops blinking.
4. Contact your Siemens service representative if you notice a missing color, geometric distortion, or other incorrect display in any of the patterns.

**[1] Instructions for Use**

Location of  
monitor buttons 4-12

## Degaussing the Monitor

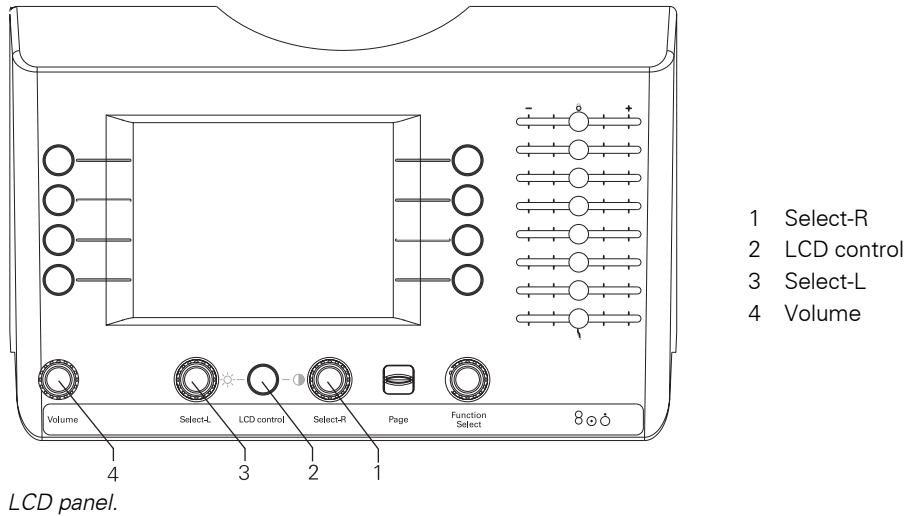
The color display on the monitor can become distorted from electromagnetic buildup. You can correct these distortions using the Degauss button.

### To degauss the monitor:

- Press the Degauss button.

**Note:** A ten-minute charge time is required before the next activation of the Degauss button.

## Adjusting Controls on the LCD



### To adjust the brightness or contrast control for the LCD:

1. Press the **LCD CONTROL**.

The system displays a screen for adjusting the contrast or brightness. Bar graphs represent the contrast and the brightness values.

2. Rotate the **SELECT-L** control clockwise to increase or counterclockwise to decrease the display contrast.

The bar graph for the contrast value corresponds to the adjusted value.

3. Rotate the **SELECT-R** control clockwise to increase or counterclockwise to decrease the brightness.

The bar graph for the brightness value corresponds to the adjusted value.

## Audio Volume

The **VOLUME** control located at the bottom of the LCD panel adjusts the sound of the speakers.

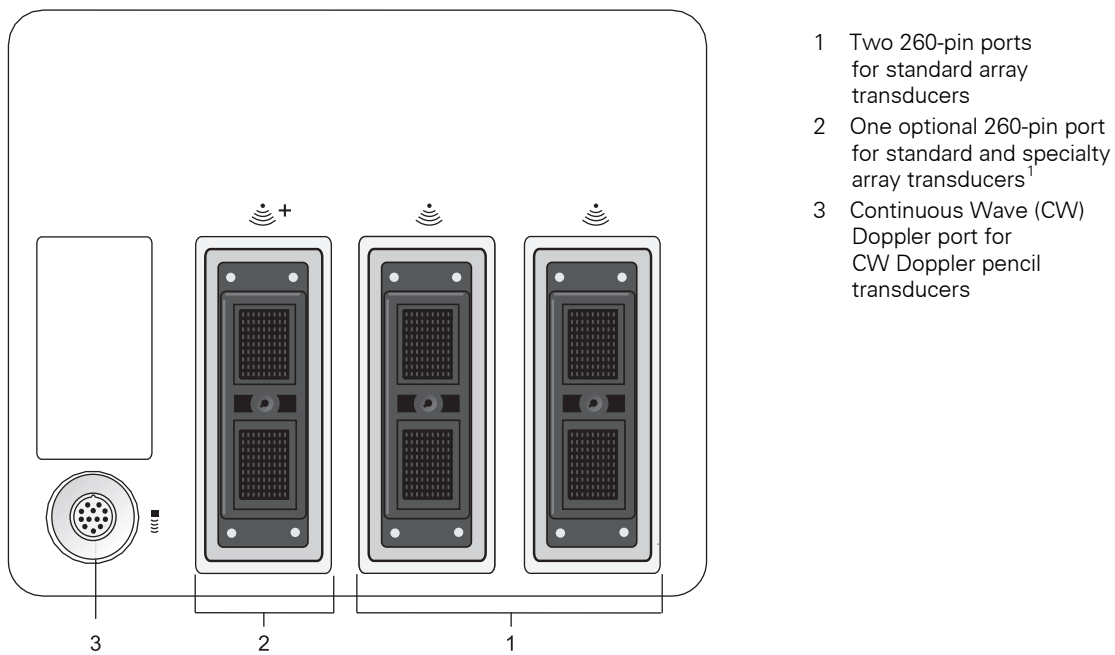
### To adjust the volume:

- Turn the **VOLUME** control clockwise to increase or counterclockwise to decrease the audio output.

## Connecting and Disconnecting Transducers

**⚠ Caution:** Ensure that the system is in freeze before connecting and disconnecting transducers. If a transducer is disconnected before the image is frozen, the system will display an error message, and it will be necessary to reset the system before continued use.

You can connect multiple transducers to the ultrasound system, with one transducer being the **active** transducer. Press the **TRANSDUCER** key on the control panel to activate an LCD display of the names of the transducers currently connected to the system.



*Example of transducer ports and optional transducer port.*

<sup>1</sup> Not available for SONOVISTA systems



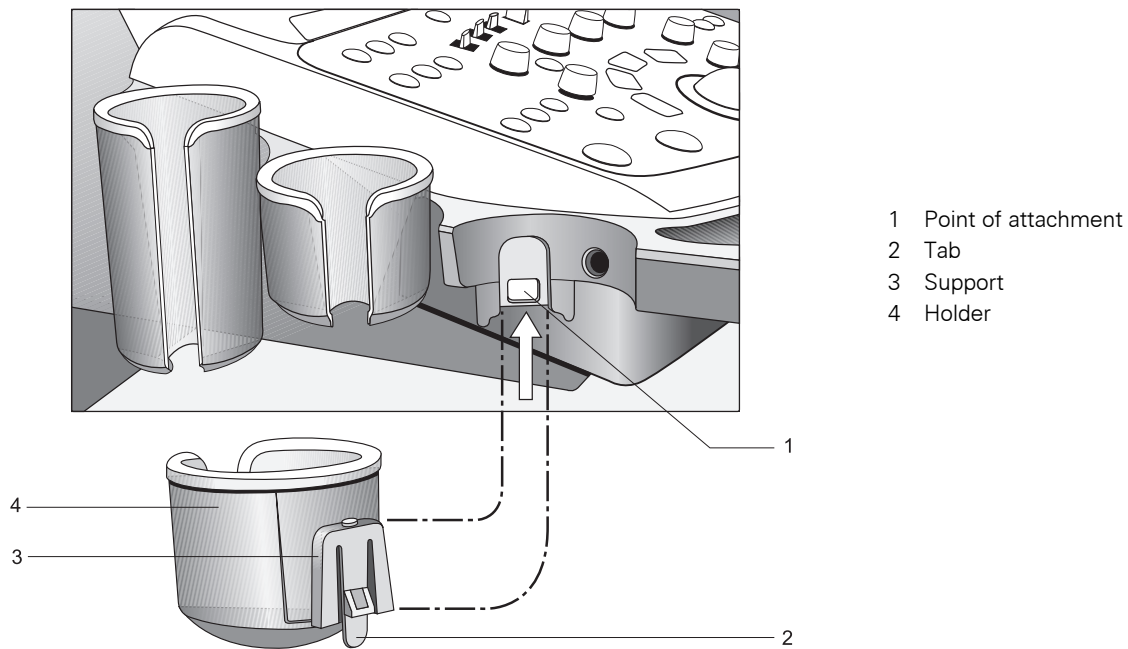
## Protective Transducer Holder

**⚠ Caution:** Transducer holders have variable sizes, both in depth and diameter. To avoid transducer damage, you must use the holder or insert provided for transducers that have small or large diameter handles or for specialty transducers, such as endocavity transducers.

After connecting a transducer to the system, place the transducer in the protective holder attached to the control panel platform. A holder can also be used for the coupling agent (gel).

## Transducer Holders

The transducer holders on the sides of the control panel are interchangeable and replaceable.



*Example of transducer holders.*

**To remove a transducer holder:**

1. Reach under the holder to locate the tab on the holder.  
The tab extends below the point of attachment to the ultrasound system.
2. Squeeze the tab towards the holder and pull the holder downward.

**To install a transducer holder:**

Align the support on the holder directly below the point of attachment on the ultrasound system and firmly push upwards until the holder snaps into place.

**Transducer Cable Management**

After you have connected and secured a transducer, drape the transducer cable through one of the cable hangers located on the sides and front of the ultrasound system. These hangers provide support for the transducer cables, keep cables off the floor, and help to prevent tangling of the cables when more than one transducer is connected to the system.

## Array Transducers

Connect an array transducer to any of the available array ports.

**⚠ Caution:** You must freeze the system before connecting or disconnecting a transducer.

**Note:** When transducer connectors are being attached to or disconnected from the system, resistance may be encountered due to the special shielding material inside the connectors. This is normal for these transducers.

### To connect an array transducer:

1. Hold the transducer connector with the cable extending upward from the connector.
2. Insert the connector pins into the system port. Adjust the connector until you can turn the lever on the transducer connector clockwise to lock it in position.

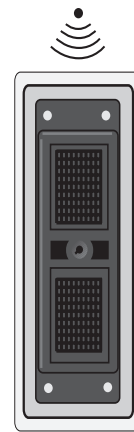
This secures the connector in position and ensures the best possible contact.

3. Place the transducer in the transducer holder and drape the cable through the cable hangers.

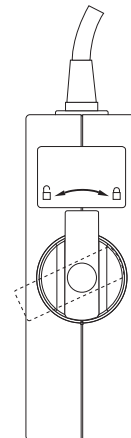
### To disconnect an array transducer:

**⚠ Caution:** To avoid damaging the transducer cable, do not pull on the cable to disconnect the transducer. Use the following instructions.

1. Turn the lock on the connector housing counterclockwise until it unlocks.
2. Firmly grasp the transducer connector and carefully remove it from the system port.
3. Store each transducer in its protective carrying case.



*Array transducer port.*



*Locked and unlocked positions of the connector.*

## Specialty Array Transducers

(Requires the Additional Array Port Option)

Connect a standard array transducer or a specialty array transducer, such as the C6F3 transducer, to the specialty array transducer port.

**⚠ Caution:** You must freeze the system before connecting or disconnecting a transducer.

**Note:** When transducer connectors are being attached to or disconnected from the system, resistance may be encountered due to the special shielding material inside the connectors. This is normal for these transducers.

### To connect an array or specialty array transducer:

**Note:** You can connect the C6F3 and BE9-4 transducers to the specialty array port only. The system displays a message should you attempt to connect the transducer to another port.

1. Hold the transducer connector with the cable extending upward from the connector.
2. Insert the connector pins into the system port. Adjust the connector until you can turn the lever on the transducer connector clockwise to lock it in position.

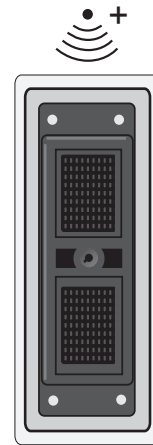
This secures the connector in position and ensures the best possible contact.

3. Place the transducer in the transducer holder and drape the cable through the cable hangers.

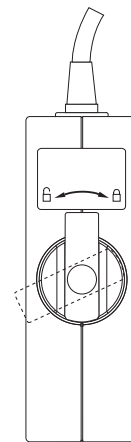
### To disconnect an array or specialty array transducer:

**⚠ Caution:** To avoid damaging the transducer cable, do not pull on the cable to disconnect the transducer. Use the following instructions.

1. Turn the lock on the connector housing counterclockwise until it unlocks.
2. Firmly grasp the transducer connector and carefully remove it from the system port.
3. Store each transducer in its protective carrying case.



*Specialty array transducer port.*



*Locked and unlocked positions of the connector.*

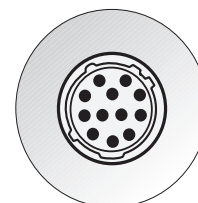
## Continuous Wave Transducers

(Requires the Cardiac Imaging Option)

(Not available for SONOVISTA systems)

Connect a continuous wave transducer to the round sector port located to the left of the array ports.

**⚠ Caution:** You must freeze the system before connecting or disconnecting a CW transducer.



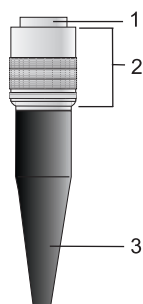
*Continuous wave transducer port.*

### To connect a continuous wave transducer:

1. Align the connector key until it fits smoothly into the receptacle.
2. Insert the connector into the system port until it locks in position.

### To disconnect a continuous wave transducer:

- ⚠ Caution:** To avoid damaging the transducer cable, do not pull on the cable to disconnect the transducer. Use the following instructions.
1. Pull on the connector housing ring to disengage the locking mechanism. Continue pulling on the ring to remove the connector from the system port.
  2. Store each transducer in its protective carrying case.



- 1 Connector
- 2 Retractable connector housing
- 3 Transducer cable

*Example of CW transducer connector.*

## Connecting System Accessories

### Footswitch

The ultrasound system has an optional dual-pedal, watertight footswitch.

#### To connect the footswitch to the system:

- Insert the footswitch connector housing into the socket located on the side panel.



*Footswitch label identifying the connector socket.*

### ECG (EKG) Cables

(Requires the Cardiac Imaging Option)

The ECG feature allows the system to display a scrolling ECG waveform on the image screen. You can adjust gain using the LCD.

#### To connect the ECG cables:

- Insert the six-pin ECG connector into the socket labeled ECG on the front of the system.



*ECG label identifying the connector socket.*

### External ECG

(Requires the Cardiac Imaging Option)

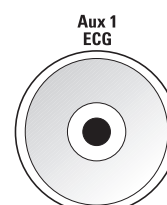
(Not available for SONOVISTA systems)

**⚠ WARNING:** The Aux 1 ECG input is not intended for direct connection to the patient. To reduce the risk of electrical shock while using this connection, ensure that the external source (peripheral equipment) is properly set up and is designed for direct patient connection.

You can connect an external ECG cable to the ultrasound system for use with the ECG function.

#### To connect the external ECG cable:

- Connect the one-pin external ECG cable to the socket labeled "Aux 1 ECG" on the front of the system.
- To connect the external ECG cable to a device (external source), see the device manufacturer's operating instructions.





*Aux 1 ECG connector socket.*

#### [1] Instructions for Use

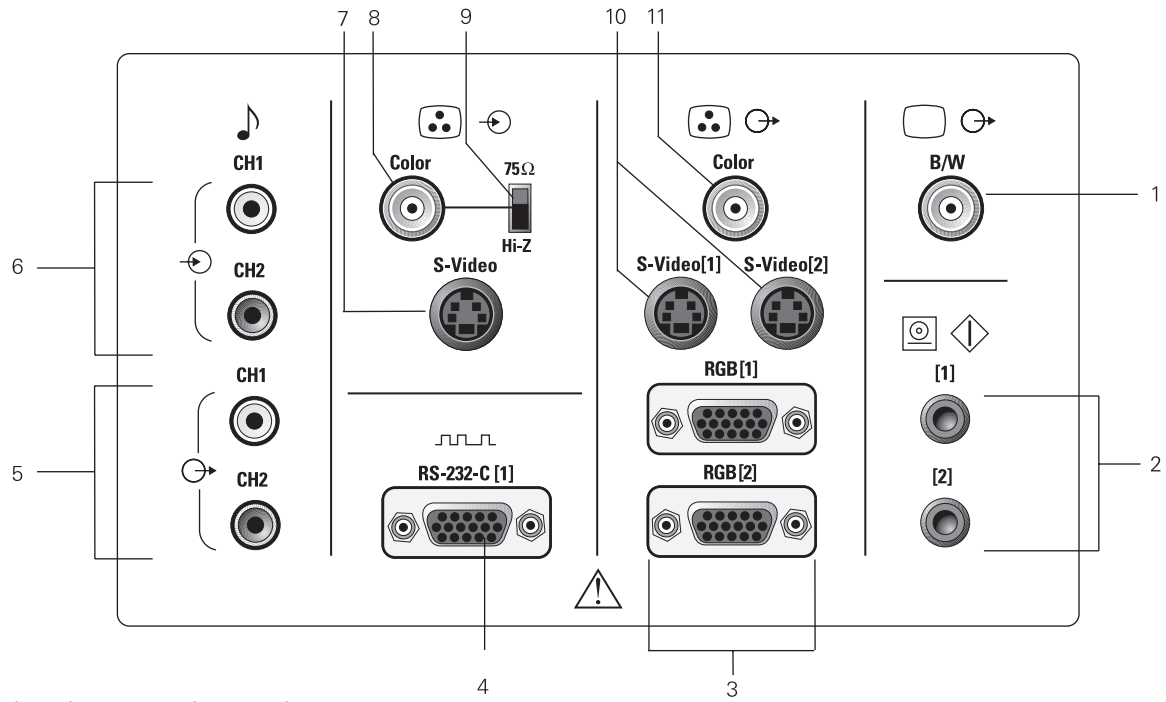
Peripheral Equipment	4-26
----------------------	------

## Input/Output Panel Connections

Audio and video connections are located on the input/output panel located at the rear of the shelf under the control panel.

-  **WARNING:** Accessory equipment connected to the analog and digital interfaces must be certified according to the respective EN and IEC standards (for example, EN 60950 and IEC 60950 for data processing equipment and EN 60601-1 and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standards EN 60601-1-1 and IEC 60601-1-1. Anyone who connects additional equipment to any signal input or signal output ports configures a medical system and is therefore responsible that the system complies with the requirements of the system standards EN 60601-1-1 and IEC 60601-1-1. Siemens can only guarantee the performance and safety of the devices listed in the *System Reference*. If in doubt, consult the Siemens service department or your local Siemens representative.
-  **Caution:** To ensure proper grounding and leakage current levels, it is the policy of Siemens to have an authorized Siemens representative or approved third party perform all on-board connections of documentation and storage devices to the ultrasound system. The *System Reference* lists the peripheral devices specified for use with the ultrasound system.

System Reference	
Accessories and Options	Ch 2

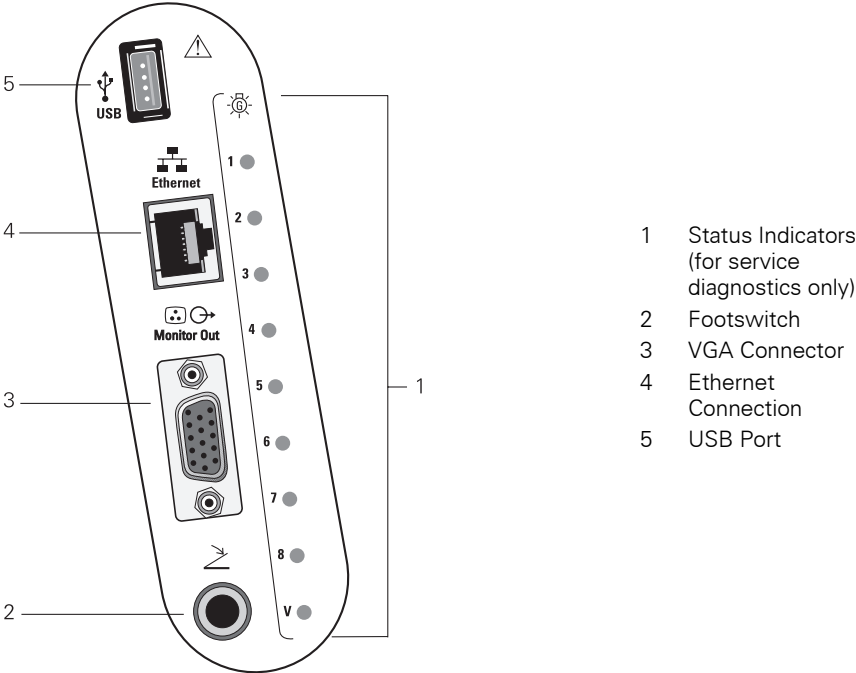


*Input/output panel connections.*

- |  |                                |
|--|--------------------------------|
| 1 B/W Printer Out  | 7 Color In (S-Video)           |
| 2 Printer control connections (remote control 1, remote control 2) | 8 Color In (BNC)               |
| 3 Color Printer Out (RGB)  | 9 Video Impedance Control      |
| 4 Serial Port 1  | 10 Color Printer Out (S-Video) |
| 5 Audio Out  | 11 Color Printer Out (BNC)     |
| 6 Audio In   |                                |

The impedance of the video input to the ultrasound system must be matched to the output impedance of the peripheral device using the video impedance control. Standard video devices have an output impedance of 75 ohms, so the video impedance control is normally set to the 75-ohm position.





Example of side panel connections.

## Connecting Peripheral Equipment

On-board peripheral devices must be installed by an authorized Siemens representative or by a Siemens approved third party. Any use of other devices with the system will be at the user's risk and may void the system warranty.

In order to fulfill EN 60601-1-1 and IEC 60601-1-1 (Medical Electrical Equipment, Part 1: General Requirements for Safety) requirements, connection of peripheral equipment to your ultrasound imaging system must adhere to one of the following conditions:

- The peripheral equipment itself is a medical device approved according to EN 60601-1 and IEC 60601-1, or
- Non-medical peripheral equipment approved according to any other EN or IEC standard (EN XXXXX or IEC XXXXX, e.g., equipment complying with EN 60348 and IEC 60348, EN 60950 and IEC 60950, etc.) must use the following setup for connection:
  - Connect the imaging system to an independent protective earth terminal, with a ground wire connection to the ultrasound systems equipotential connector. Ensure that the protective earth wire is connected to a qualified protective earth connection independent of the existing systems earth connection (via the power cable).
  - The peripheral equipment is located at least 1.5 meters (1.8 meters [6 feet] in Canada and the U.S.A.) outside of the patient environment. A patient environment is defined as the area in which medical examination, monitoring, or treatment of the patient takes place.
  - The peripheral equipment is connected to a main outlet outside the patient environment but still within the same room as the imaging system.

For additional information and other possible combinations, please refer to the Medical Electrical Equipment Standard EN 60601-1-1 or IEC 60601-1-1, Annex BBB.7, Scenario 3c.

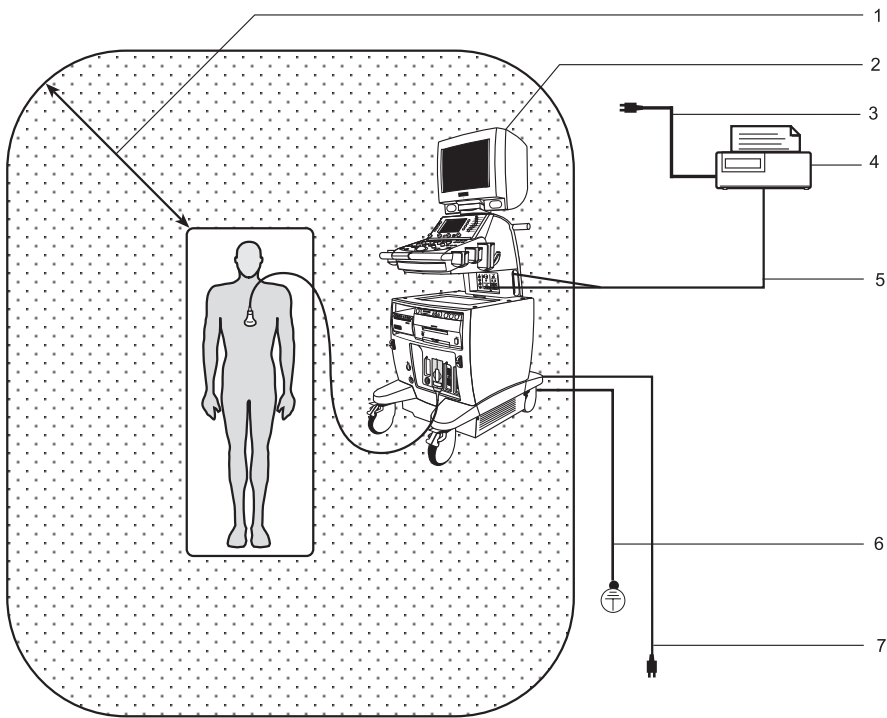
**Note:** The above information is based on current EN 60601-1-1 and IEC 60601-1-1 standards, dated 2000-12. If your country's regulatory standards for medical equipment do not correspond to EN 60601-1 and IEC 60601-1 as well as EN 60601-1-1 and IEC 60601-1-1, your local requirements may be different.

### System Reference

Report Printers Ch 4



*Equipotential connector located on power panel of imaging system.*



Example of a Peripheral Equipment Connection and Patient Environment.

- |  |   |
|--|---|
| 1 Patient environment (represented by dot pattern, extending exactly 1.5 meters (1.8 meters [6 feet] in Canada and the U.S.A.) around patient and ultrasound system) | 4 Peripheral equipment (EN XXXXX and IEC XXXXX) |
| 2 Ultrasound system  | 5 RS-232C cable or video in/out                 |
| 3 Peripheral equipment power   | 6 Additional Protective Earth (refer to 4-26)   |
|  | 7 Ultrasound system power                       |

Serial Port

The system has a serial port for connecting to a PC or to a serial (and parallel) printer(s). Parallel printers require a serial-to-parallel converter.

Configuring the Serial Port

Use the system presets to select the destination for data sent through the serial port on the ultrasound system.

**Caution:** Should you disconnect the RS-232C cable from peripheral equipment, always connect the termination cap to the cable connector. The termination cap protects the pins on the connector and protects the system from potential image degradation due to radio wave interference.



F4

Peripheral  
► External RS-232C Port

## System Ergonomics

You can make the following adjustments to the system:

**Monitor** – You can tilt and swivel the monitor for optimal viewing while scanning. The sides of the monitor provide a general handhold for tilting and swiveling the monitor.

**Keyboard** – You can slide the keyboard out away from the control panel when in use and back under the control panel when not in use.

# General System Settings

You can change general system settings such as the on-screen display of the date, time, and hospital name using the system presets. These settings display on the image screen as well as on patient reports.

**Note:** If the setup menus are accessed when the system is in freeze, you must unfreeze the system to display the changes.

**System Reference**

System Presets      Ch 3

## Modifying Hospital or Clinic Name

To change the hospital or clinic name, enter a new name into the system preset.



**F4**

General  
► Hospital Name

**To change the hospital name:**

1. Press the **F4** key on the keyboard to access the system presets.  
The system displays the **Preset Main Menu** screen.
2. Roll the trackball to **General** on the left of the screen and then press the **SET** key on the control panel.
3. Roll the trackball to **Hospital Name**, and then press the **SET** key.
4. Enter a name and then press the **SET** key. You can enter up to 60 characters.
5. Roll the trackball to **Save** and then press the **SET** key to store the new settings and exit the system presets.

# Setting System Date and Time

The date is displayed numerically on the upper right of the image screen. You can enter a new date and time, and you can select the format in which the date displays on-screen: Day/Month/Year or Month/Day/Year.

To accommodate a Daylight Savings Time change, the system time can be offset by adding (+) or subtracting (-) one hour.

**Note:** If a study is open, close the study before changing the date and time.

**Note:** To view your changes to the image screen, unfreeze the system.


## To select the date format:

1. Press the **F4** key on the keyboard to access the system presets.  
The system displays the **Preset Main Menu** screen.
2. Roll the trackball to **General** on the left of the screen.
3. Roll the trackball to **Month/Day/Year** or **Day/Month/Year** in the **Date Format** area, then press the **SET** key on the control panel.
4. Roll the trackball to **Save** and then press the **SET** key to store the new settings and exit the system presets.

## To change the system date:

1. Press the **F4** key on the keyboard to access the system presets.  
The system displays the **Preset Main Menu** screen.
2. Roll the trackball to **Day / Time** and then press the **SET** key on the control panel.  
The system displays the **Date and Time Properties** screen.
3. Enter the date by completing the Date fields.
  - a. Select a month from the list of months.
  - b. Select a year from the list of years.
  - c. Select a day from the calendar.
4. Roll the trackball to the **OK** button or to the **Apply** button and then press the **SET** key.

**Note:** Selecting **OK** applies the change and closes the window; selecting **Apply** applies the change and leaves the window open.

System Reference	
System Presets	Ch 3
	
F4	
General	
▶ Date format	
Day / Time	

**To change the system time:**

1. Press the **F4** key on the keyboard to access the system presets.  
The system displays the **Preset Main Menu** screen.
2. Roll the trackball to **Day / Time** and then press the **SET** key on the control panel.  
The system displays the **Date and Time Properties** screen.
3. Enter the time by completing the **Hour**, **Minute**, and **Second** fields.  
Use the **Tab** key to advance to the next field. Use the trackball to reposition the text cursor if you need to make a correction.
4. Roll the trackball to the **OK** button or to the **Apply** button and then press the **SET** key.

**Note:** Selecting **OK** applies the change and closes the window; selecting **Apply** applies the change and leaves the window open.


**To adjust the time for Daylight Savings:**

1. Press the **F4** key on the keyboard to access the system presets.  
The system displays the **Preset Main Menu** screen.
2. Roll the trackball to **Day / Time** and then press the **SET** key on the control panel.  
The system displays the **Date and Time Properties** screen.
3. Roll the trackball to the **Time Zone** tab and then press the **SET** key on the control panel.
4. Select the time zone from the list.  
If Daylight Savings time is used by that time zone, then a check box displays at the bottom of the window.
5. To adjust for Daylight Savings time, select the check box.
6. Roll the trackball to the **OK** button or to the **Apply** button and then press the **SET** key.

**Note:** Selecting **OK** applies the change and closes the window; selecting **Apply** applies the change and leaves the window open.

## Software Installation

Use the set of CDs (compact disks) provided by Siemens to install system software.

 **Caution:** Use extreme caution with these software installation procedures. Do not leave CD 1 in the CD drive when not installing software. If CD 1 is in the CD drive when you cycle power to the ultrasound system (other than during software installation procedures), then CD 1 overwrites the system's hard disk.



# Installing and Reinstalling System Software

Use this procedure to:

- Reinstall system software.

## To install or reinstall system software:

**Prerequisite:** If you plan to delete user-defined settings during software installation (by selecting **Initialize Preset** on the **System/Language** screen), then Siemens recommends that you make a backup copy of user-defined settings (system presets, QuickSets, and OB tables and formulas) before beginning this procedure.

**Note:** This procedure is approximately 15 minutes in duration.

1. With the system powered on, insert the disk containing the new system software into the disk drive located on the left of the ultrasound system.
2. Press the **F4** key on the keyboard to display the **Preset Main Menu** screen, select **System/Language** on the left of the screen, and then select one of the following selections:
  - Select **Retain Current Preset** to retain user-defined settings (system presets, QuickSets, OB tables and formulas) and retain the current language selection.
  - Select **Initialize Preset** to delete user-defined settings (system presets, QuickSets, OB tables and formulas) and reset the language selection to the factory default.
3. Select the **Upgrade System** button to begin software installation.
4. If the system displays a confirmation message, then select **Yes** to confirm the operation.

The system displays a progress bar. When the software installation is complete, the system displays a message requesting "restart" of the system.

5. Cycle power to the system.
  - a. Press the green ON/OFF (⊙/⊠) switch to power off the system.
  - b. When the screen goes dark, press the green ON/OFF (⊙/⊠) switch to power on the system.

The system displays a progress bar at the bottom of the screen.

[2] Instructions for Use	
QuickSets	Ch A1
System Reference	
Disk Drive Storing	Ch 4
System Presets Storing and Retrieving System Presets and QuickSets	Ch 4

6. Wait approximately 10 minutes for the software to install.

The system indicates advancement of the software installation using the progress bar at the bottom of the screen.

7. When the system displays the image screen, press the eject button near the disk drive and remove the disk.
8. To change the system language selection (if reset during the software installation) and then cycle power:
  - a. Press the **F4** key to display the **Preset Main Menu** and then select **Language/System** on the left of the screen.
  - b. Select the required language and then select the **Change Language** button.
  - c. Press the green ON/OFF (⊙/⊙) switch to power off the system.  
After several minutes, the screen on the system goes dark.
  - d. When the screen goes dark, press the green ON/OFF (⊙/⊙) switch to power on the system and then follow the on-screen instructions.
9. To cycle power to the system without changing the system language selection:
  - a. Press the green ON/OFF (⊙/⊙) switch to power off the system.  
After several minutes, the screen on the system goes dark.
  - b. When the screen goes dark, press the green ON/OFF (⊙/⊙) switch to power on the system.

Installation is complete when the system displays the image screen.

## Software-Based Option Installation

You can install or uninstall a software-based option on the ultrasound system. One key disk is required for one option per system. You cannot concurrently install a key disk option on multiple systems. If subsequently uninstalled, the option key disk can be installed on a different ultrasound system.

Observe the following precautions when using a key disk:

- Do not power on the ultrasound system with a key disk inserted in the USB port.
- Do not remove the key disk during option installation or uninstallation.

### To install a software-based option:

1. Insert the source media containing the option into the USB port on the right of the system.

2. Press the **F4** key on the keyboard.

The system displays the **Preset Main Menu**.

3. Select **Installation from Key Disk**.

4. Select the **Install** button.

The system displays a confirmation dialog box.

5. Select the **OK** button.

The option is installed. When the installation is complete, the system displays a new message box.

6. Select the **OK** button.

The option is listed on the Installed Option screen.

7. Remove the source media from the USB port.

**Note:** The key disk option is valid only for the original system on which it is installed. To ensure the key disk option can be reloaded onto this system, record the serial number of the system and keep it with the source media.

**To uninstall a software-based option:**

1. Insert the source media containing the option into the USB port on the right of the system.
2. Press the **F4** key on the keyboard.  
The system displays the **Preset Main Menu**.
3. Select **Installation from Key Disk**.
4. Select the **Uninstall** button.  
The system verifies that the inserted source media matches an installed option and then displays a confirmation box.
5. Select the **OK** button.  
The option is uninstalled. When the process is complete, the system displays a new message box.
6. Select the **OK** button.  
The option is no longer listed on the Installed Option screen.
7. Remove the source media from the USB port.

**Note:** The key disk option is valid only for the original system on which it is installed. To ensure the key disk option can be reloaded onto this system, record the serial number of the system and keep it with the source media.

## 5 Beginning an Examination

---

<b>Patient Registration .....</b>	<b>3</b>
Bypassing Registration .....	3
Registering a Patient .....	3
Calendar Tool .....	5
General and Exam-Specific Clinical Data .....	5
General Information ▪ All Exam Types.....	6
Specific Patient Data Information ▪ OB, Early OB, GYN, and EM .....	7
Specific Patient Data Information ▪ C-Vas, P-Vas, Venous, and Surgical.....	8
Specific Patient Data Information ▪ Cardiac.....	8
Specific Patient Data Information ▪ Urology .....	8
Using the DICOM Modality Worklist Search Feature .....	9
Selecting Another Procedure.....	10
Fields Displayed on the Worklist Search Screen .....	11
Fields Displayed on the Choose Procedure Screen.....	12
Editing Patient Data .....	12
<b>Changing the Exam Type.....</b>	<b>13</b>
Accessing the Exam and QuickSet List .....	13
Exam Type Abbreviations .....	14
<b>Activating a Transducer.....</b>	<b>15</b>
<b>Selecting an Operating Mode .....</b>	<b>16</b>
<b>Examination Completion .....</b>	<b>17</b>
Printing a Patient Report.....	17
Video Printer (On-board) .....	17
Peripheral Printer (Off-board).....	17
Ending an Exam.....	18



# Patient Registration

You can register patients for examinations or bypass registration to immediately begin examinations.

## Bypassing Registration

You can begin a patient examination without registering the patient.

The system automatically enters an asterisk (\*) for the name and a date/time code for the **ID field** (Patient Identification) when you store or print the first image. The asterisk and date/time code display on the image until you complete the patient name and identification fields in the patient registration form.

## Registering a Patient

You can search for previously entered registration data or register a patient for examination using the patient registration form. The form contains general and exam-specific information. A calendar tool is available for entering date-dependent information for OB exams.

Use the system presets to automatically store the patient registration form to the registered patient's study on the system's hard disk when you end the patient examination ("close the study").

### To register a patient:

- To display the **New Patient Data** form, choose a method:
  - Press the **F1** key on the keyboard.
  - Press the **NEW PATIENT** key on the control panel.

**Note:** You can also review and edit the existing patient data by pressing the **F3** key on the keyboard or the **PATIENT DATA** key on the control panel.
- To retrieve existing patient information from the hard disk or inserted external disk media:
  - Press the **REVIEW** key on the control panel.
  - If the system displays the Image screen, select the **Study Screen** button to display the Study screen.
  - Select the required disk from the **Disk** section of the Study screen to display studies stored on the disk.
  - Select the required study and then select the **New** button.

The system displays the **New Patient Data** form containing the patient information from the selected study.



**F4**

Patient ID  
▶ AutoStore New  
Patient Form

### [1] Instructions for Use

Using Worklist  
Search 5-9

3. Use the keyboard to enter or edit the patient information in the form.

**Note:** The system automatically assigns an asterisk (\*) for empty name fields and a date/time code for an empty **ID** field. The asterisk and date/time code are displayed on the image.

To:	Perform this action:
Move the text cursor to the beginning position of the next entry field	Press the <b>Tab</b> key on the keyboard. You can also roll the trackball to the next field and then press the <b>SET</b> key on the control panel.
Delete characters	Press the <b>Backspace</b> key on the keyboard.
Select a button or object on the form	Roll the trackball to the button or object and then press the <b>SET</b> key.

4. Select a study type from the **Exam** section of the form.

5. To confirm your entries, select **OK**.

**Note:** Alternatively, Press the **Enter** key on the keyboard after moving the text cursor to an entry field.

The system displays the image screen with the new patient information.

6. To exit the form without saving the entries, select **Cancel** at the bottom of the form.

The system redisplay the image screen with the previous patient's information and discards the entries on the new patient data form.

---

**[1] Instructions for Use**

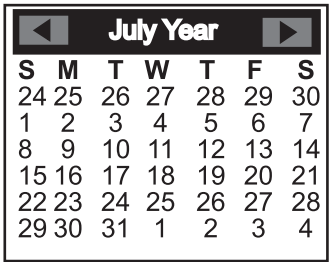
---

General  
Information-  
All Exam Types 5- 6



Calendar Tool

You can display a calendar tool in the **Patient Data** form for use with OB exams.



Example of Calendar Tool.

To use the calendar tool:

- 1. Roll the trackball to select the down arrow (▼) on a date field of the patient data form and press the **SET** key to access the calendar.  
  
If a date has not been entered in the **LMP** field, the calendar automatically displays a date 60 days before the examination date. To confirm this date, select the **OK** button. To select another date, scroll through the months of the calendar.
- 2. To scroll through the months of the calendar, select either the back arrow (◀) or the forward arrow (▶).
- 3. Roll the trackball pointer to a date and then press the **SET** key.  
  
The system exits the calendar tool and places the selected date in the **Patient Data** form.
- 4. To exit the calendar without saving changes, select the **Cancel** button below the calendar.

General and Exam-Specific Clinical Data

The **Patient Data** form contains a **Physical/Clinical History** section. This section contains general data entry fields for all exam types and specific fields for the following exam types:

- OB, Early OB, GYN, and EM
- OB(J) (For use with systems sold in Japan only)
- C-Vas, P-Vas, Venous, and Surgical
- Cardiac
- Urology

**System Reference**  
System Presets Ch 3

- ☰
- F4**
- M&R
  - ▶ Measurement and Report Preset
  - ▶▶ Display Item
- General
  - ▶ Date Format
  - ▶ Height and Weight Format

## General Information ■ All Exam Types

The system transfers patient information to the patient report for exam types with a report. Use the system presets to select the measurement convention for the height and weight fields and to include an operator ID and the referring physician's name in a report.



### F4

General

M&R

► Measurement  
and Report Preset

►► Display Item

In this field:	Enter:
<b>Family Name</b>	Patient's last name.
<b>Given Name(s)</b>	Patient's first name(s).
<b>Middle Name(s)</b>	Patient's middle name(s).
<b>Prefix</b>	Patient's title. Examples include Dr. and Mrs.
<b>Suffix</b>	Expression appended to patient's name. Examples include PhD. and Jr.
<b>Accession Number</b>	Identification code indicating the sequence of the current study as related to other studies for this patient. Used for billing purposes. Typically generated by a HIS/RIS (Worklist) server.  <b>Note:</b> This information is not transferred to the patient report.
<b>ID</b>	Identification code for the patient.
<b>DOB</b>	Patient date of birth using the format selected in system presets.  The system automatically calculates the patient age and displays the value in the <b>AGE</b> field.
<b>Gender</b>	Patient's sex.
<b>Referring MD</b>	Name of the referring physician.
<b>Physician ID</b>	Identification of the physician.
<b>Height</b>	Patient height using the convention selected in the system presets.
<b>Weight</b>	Patient weight using the convention selected in the system presets.
<b>Indication</b>	Additional information.

## Specific Patient Data Information ■ OB, Early OB, GYN, and EM

In this field:	Enter:	Patient Data form:			
		OB, Early OB	OB (J)	GYN	EM
<b>LMP</b>	Start date of the patient's Last Menstrual Period.  Use the keyboard or the calendar tool to enter this date. You can also allow the system to calculate the LMP based on the EDC. A calculated LMP displays two asterisks (**) next to the date. The system calculates this value when you specify an EDC.	✓	✓	✓	✓
<b>EDC/LMP</b>	Estimated Date of Confinement.  The system automatically calculates and displays the Estimated Date of Confinement based on the LMP date. (EDC = LMP + 280 days). Use the calendar tool to enter a different date.	✓	✓		
<b>IVF Date</b>	Date of In-vitro Fertilization.  Use the keyboard or the calendar tool to enter this date. A calculated IVF displays two asterisks (**) next to the date. The system calculates this value when you specify an EDC.	✓	✓		✓
<b>EDC/IVF</b>	Estimated Date of Confinement.  The system automatically calculates and displays the Estimated Date of Confinement based on the IVF date. (EDC = IVF Date + 266 days). Use the calendar tool to enter a different date.	✓	✓		✓
<b>Clinical Menstrual Age Based On</b>	Basis of Clinical Menstrual Age (CMA).  The system calculates and displays the CMA based on the LMP or IVF date already entered. Press the <b>SET</b> key to specify whether the LMP date or IVF date will be used to determine the Clinical MA.	✓	✓	✓	✓
<b>Clinical MA</b>	The system calculates and displays the Clinical Menstrual Age using the LMP or IVF. The Clinical MA displays in the patient report.	✓			✓
<b>Gravida Para AB Ectopic</b>	Patient history of pregnancies, entered with the number keys.  The entries in these fields are transferred to the Patient Report, but do not display on the image screen.	✓	✓	✓	✓
<b>MAFP</b>	Maternal Alpha-Fetoprotein level, up to four numbers, including an optional decimal place.	✓	✓		✓
<b>Fetal Age</b>	The system calculates and displays Fetal Age based on the LMP or IVF date already entered. Fetal Age displays as weeks ( <b>w</b> ) and days ( <b>d</b> ).		✓		

## Specific Patient Data Information ■ C-Vas, P-Vas, Venous, and Surgical

In this field:	Enter:	Patient Data form:			
		C-Vas	P-Vas	Venous	Surgical
<b>Left(SYS/DIA)</b>	Left blood pressure, using the systole over diastole measurement in mmHg.	✓	✓	✓	✓
<b>Right(SYS/DIA)</b>	Right blood pressure, using the systole over diastole measurement in mmHg.	✓	✓	✓	✓
<b>Left</b>	Ankle Brachial Index (ABI).		✓		
<b>Right</b>	Ankle Brachial Index (ABI).		✓		

**Note:** This information is not transferred to a Surgical report.

## Specific Patient Data Information ■ Cardiac

In this field:	Enter:	Patient Data form:	
		Cardiac	
<b>SYS/DIA</b>	Blood pressure, using the systole over diastole measurement in mmHg.		✓
<b>BSA</b>	<p>Patient Body Surface Area in m<sup>2</sup>. The system automatically calculates the BSA (based on Height and Weight entries) and transfers the value to the patient report.</p> <p>BSA is calculated with one of the following two formulas:</p> <p><b>For height in centimeters and weight in kilograms:</b></p> $BSA = 0.007184 \times (\text{weight})^{0.425} \times (\text{height})^{0.725}$ <p><b>For height in feet/inches and weight in pounds:</b></p> $BSA = 0.007184 \times (\text{weight} \times 0.454)^{0.425} \times (\text{height} \times 2.54)^{0.725}$		✓

## Specific Patient Data Information ■ Urology

In this field	Enter:	Patient Data form:	
		Urology	
<b>PSA</b>	Prostate specific antigen level in ng/ml.		✓

## Using the DICOM Modality Worklist Search Feature

(Option)

(Requires the DICOM 3.0 Connectivity option)

Use the Worklist feature to automatically enter patient data on the **New Patient Data** form. Systems with the Worklist option installed and the Worklist server configured display a **Worklist** button on the screen.

### To register a new patient using the Worklist feature:

1. Press the **F1** key on the keyboard to display the **New Patient Data** form.
2. Enter any required patient information for the Worklist search.
3. Select the **Worklist** button to perform a Worklist search. The system will perform the search using one of the following methods:
  - If the system is configured to perform a streamlined search, it begins searching for all procedures scheduled for the next 24 hours. The system uses any data entered on the **New Patient Data** form.
  - If the system is not configured to perform a streamlined search, the system displays the **Worklist Search** screen. The system populates the search screen with any data entered on the **New Patient Data** form.
4. If a search screen is displayed, enter any additional search criteria. Press the Tab key to access the next field.
5. To cancel the search and display the previous screen, select **Cancel**.
6. To clear the entered search criteria, select **Clear**.
7. To begin the search from the **Worklist Search** screen, select **Search**.

The system displays the search results at the top of the **Worklist Search** screen and activates the **Scheduled Procedures** field and the **Select** button.



**F4**

---

DICOM

► Worklist Server

►► Streamlined Search

8. To sort the studies from the Worklist search:
  - Select a column heading to sort the files in ascending order by heading. Select the heading again to sort in descending order.
9. To select a study from the Worklist search:
  - a. Select a study from the **Worklist Search** screen.  
The system displays the study code and description in the **Scheduled Procedures** field.
  - b. Select the **Select** button or double-click the selection to transfer the patient data from the Worklist server to the **New Patient Data** form.

**Note:** You are not able to edit the following fields on patient data transferred from the Worklist server: Patient Name, Patient ID, Accession #, DOB/Age, Sex.

## Selecting Another Procedure

(Option)

(Requires the DICOM option and the DICOM Modality Worklist option)

You can select another procedure for the currently registered patient.

### To select another procedure for the currently registered patient:

1. Press the **REVIEW** key on the control panel to display the Image screen.
2. Select the **Procedure Screen** button on the left of the screen to display the **Choose procedure** screen.  
**Note:** This selection is available when a connected DICOM Worklist server contains multiple procedures for the currently registered patient.
3. Select the procedure from the **Scheduled Procedure(s)** drop-down list and then select the **Select** button on the right of the screen.  
The system displays a confirmation message.
4. Select **OK** to confirm the closing of the current procedure and the starting of the selected procedure.  
The system displays a message requesting either completion or discontinuation of the closed procedure.
5. To complete the closed procedure, select **Completed**.
6. To discontinue the closed procedure, select **Discontinued**.
7. Select the **Live Screen** button to display the image screen and begin the selected procedure.

## Fields Displayed on the Worklist Search Screen

In this field:	Enter:
<b>Scheduled Procedures</b>	Lists available procedures for the selected study. Procedures are identified by study code and description.
<b>Patient Name</b>	(Heading [title] for a group of selections.)
<b>Last</b>	Last name. Use an asterisk (*) to indicate partially known values. For example, to search for the last name "Miller", you can enter "Mil*" or "*ler".
<b>First</b>	First name. Use an asterisk (*) to indicate partially known values. For example, to search for the first name "Christopher", you can enter "Chris*" or "*pher".
<b>Middle</b>	Middle initial.
<b>Patient ID</b>	Identification code for the patient, using up to 64 characters. Searching for the ID requires an exact match.
<b>Date</b>	Dates for the search.
<b>Accession #</b>	Identification code indicating the sequence of the current study as related to other studies for this patient. Used for billing purposes. Typically generated by a HIS/RIS (Worklist) server.  Searching for the accession number requires an exact match.
<b>Performing Physician</b>	(Heading [title] for a group of selections.)
<b>Last</b>	Last name. Use an asterisk (*) to indicate partially known values. For example, to search for the last name "Miller", you can enter "Mil*" or "*ler".
<b>First</b>	First name. Use an asterisk (*) to indicate partially known values. For example, to search for the first name "Christopher", you can enter "Chris*" or "*pher".
<b>Middle</b>	Middle initial.
<b>Requested Procedure ID</b>	Requested procedure ID. Searching for the requested procedure ID requires an exact match.
<b>Scope: US only or This System only</b>	Select <b>US only</b> to search for procedures scheduled on all ultrasound systems; select <b>This System only</b> to confine the search to procedures scheduled on this ultrasound system.
<b>Offline</b>	Select the <b>Use Cache</b> check box to save results of the most recent Worklist search on the ultrasound system. When <b>Use Cache</b> is selected, fields and buttons within the <b>Search Criterion</b> section at the bottom of the <b>Worklist Search</b> screen are not available.  You are unable to enter search criteria or perform a search if <b>Use Cache</b> is selected.  Select the <b>Reset Cache</b> button to clear any existing Worklist search results already stored on the ultrasound system. The system then downloads the current Worklist search results onto the ultrasound system. When you select the <b>Reset Cache</b> button, the system selects the <b>Use Cache</b> checkbox automatically. You can then move the system to another location; the results of the search are available on the ultrasound system even when it is not connected to the network.  <b>Note:</b> Before performing another search, reconnect the system to the network and ensure that <b>Use Cache</b> is not selected.

## Fields Displayed on the Choose Procedure Screen

The **Choose procedure** screen displays the selections in the **Worklist Search** screen. Only the **Scheduled Procedures** drop-down list is available.

Selection	Description
<b>Scheduled Procedures</b>	Lists available procedures for the selected study. Procedures are identified by study code and description.

## Editing Patient Data

You can edit entries on the **Patient Data** form at any time during the patient examination.

### To display the Patient Data form:

1. Press the **F3** function key on the keyboard or the **PATIENT DATA** key on the control panel.

The system displays the **Patient Data** form.

2. Use the keyboard to update your entries.

Changes to the **Patient Data** form are also updated on the image screen and in the report for exams with a patient report.

Changes to fields used in calculations cause the system to update previously measured results.

3. Roll the trackball to the **OK** button and then press the **SET** key to save the revisions to the patient information and redisplay the image screen. To restore the current **Patient Data** form and redisplay the image screen without saving the revisions, roll the trackball to the **Cancel** button and then press the **SET** key.



# Changing the Exam Type

You can change the exam type at any time by making a selection from the **Exam and QuickSet List**. System-defined exam types and user-defined QuickSets display on this list. A QuickSet is an optimized configuration of imaging parameter settings for a specific transducer, exam, and operating mode.

Use the system presets to select an exam or QuickSet to automatically activate when you power on the system.

## Accessing the Exam and QuickSet List

Use one of these methods to access the **Exam and QuickSet List**:

- Press the **F5** key on the keyboard.
- Press the **EXAM** key on the control panel.
- Roll the trackball to the **EXAM** button on the **New Patient Data** or **Patient Data** form and then press the **SET** key.

### To select or change the exam type or QuickSet:

1. Access the **Exam and QuickSet List** by pressing the **F5** key on the keyboard or the **EXAM** key on the control panel.

The system displays a list of system-defined exam types and a list of QuickSets.

**Note:** If the transducer associated with a QuickSet is not connected to the system, the QuickSet is not selectable.

2. Roll the trackball to highlight the name of the required exam type or the QuickSet and then press the **SET** key. The system displays the name of the selected exam type or QuickSet in the upper left of the image screen.
3. To redisplay the image screen without selecting an exam type or QuickSet, select the **Cancel** button.

**[2] Instructions for Use**

Creating QuickSets	Ch A1
--------------------	-------



**F4**

Boot Up
► Boot Up Exam & QuickSet

## Exam Type Abbreviations

The system displays an abbreviation that indicates the active exam type in the upper left of the image screen. The system-defined exams are abbreviated as follows:

- **Abd** Abdominal
- **OB** Obstetrics
- **Early OB** Early Obstetrics
- **Breast** Breast
- **Thyroid** Thyroid
- **Testicle** Testicle
- **GYN** Gynecology
- **C-Vas** Cerebrovascular
- **P-Vas** Peripheral Vascular
- **Venous** Venous
- **Ortho** Orthopedics
- **Cardiac** Cardiac
- **Urology** Urology
- **Cranial** Cranial
- **Surgical** Surgical
- **EM** Emergency Medicine
- **OB(J)** Obstetrics (Japan)

# Activating a Transducer

Although multiple transducers can be connected to the ultrasound system, only one transducer can be active. Use the **TRANSDUCER** key on the control panel to view an LCD listing of transducers currently connected to the system.


The names of the transducers display on the LCD, with the active transducer highlighted.

Use the system presets to select the transducer port that will be active at system power-on.

**To activate a transducer connected to the system:**

- 1. Press the **TRANSDUCER** key located on the control panel.  
The system displays the names of the available transducers and options on the LCD.
- 2. Press the LCD key corresponding to the required transducer.  
The system highlights the name of the selected transducer on the LCD and activates your selection.

System Reference	
System Presets	Ch 3

	
F4	
Boot Up	
► Transducer Port Active On Boot Up	

## Selecting an Operating Mode

When powered on, the system automatically displays in 2D-mode. You can change modes by pressing the appropriate control or key located on the control panel. Selection of A-mode, full-screen M sweeps, and full-screen spectral Doppler waveforms is accomplished using LCD selections.

Use the system presets to display the 2D image simultaneously with the M-mode sweep or Doppler spectrum when M-mode or Doppler is selected. If you do not activate the bypass cursor display selection in the system presets, the system displays the 2D image with the cursor when M-mode or Doppler is selected and you must select the control a second time to display the sweep or spectrum.



### F4

Default Settings  
► Bypass M/D  
Cursor Display

Mode	Selection
<b>A-mode</b>	Press the <b>2D</b> control on the control panel, push the <b>PAGE</b> control on the LCD panel to display LCD page 3, and then press the <b>OA-mode</b> LCD selection.
<b>2D-mode</b>	Press the <b>2D</b> control on the control panel.
<b>Split (B+B) mode</b>	Press the <b>SPLIT</b> key on the control panel.
<b>Dual-mode</b>	Press the left or right <b>DUAL/SELECT</b> key on the control panel. A 2D image displays in the respective half of the image area. Press the other <b>DUAL/SELECT</b> key to display an image in the other half of the display area. The last <b>DUAL/SELECT</b> key pressed (left or right) establishes the active image. Press either key twice to display the image full-screen. Return to dual displays by pressing the key once again.
<b>4B-mode</b>	Press the <b>4B</b> key on the control panel.
<b>2D/M-mode</b>	Press the <b>M</b> control on the control panel two times while in 2D-mode.
<b>Split 2D/M-mode</b>	Press the <b>SPLIT</b> key on the control panel and then press the <b>M</b> control.
<b>M-mode</b>	Press the <b>M</b> control on the control panel two times and then press the <b>OFull M</b> LCD selection to <b>On</b> to display full-screen M-mode.
<b>Doppler</b>	Press the <b>D</b> control on the control panel two times. To display full-screen Doppler, press the <b>OFull D</b> LCD selection. An update function is available to toggle a frozen 2D image with a real-time spectrum or a real-time 2D image with a frozen spectrum. During 2D-mode with M/D-mode, the M-mode sweep is synchronized with the Doppler spectrum.
<b>Steerable Continuous Wave Doppler</b>	(Requires the Cardiac Imaging option.) Connect a phased array transducer to an array port and then press the <b>CW</b> key.
<b>Auxiliary Continuous Wave Doppler</b>	Connect a continuous wave (pencil) transducer to the CW port and then press the <b>CW</b> key.
<b>Color</b>	During 2D-mode, 2D/M-mode, or 2D with Doppler, press the <b>C</b> control.
<b>Power</b>	During 2D-mode, 2D with Doppler, or 2D with Color, press the <b>POWER</b> key.
<b>Directional Power Doppler</b>	Use the <b>ODir Power</b> LCD selection to aid in determining power flow relative to the transducer. Press <b>ODir Power</b> until the required setting displays on the LCD.

# Examination Completion

## Printing a Patient Report

For exam types with a patient report, the system transfers labeled measurements and calculations from a Measurement Menu on the image screen to a report. You can print the report to an optionally installed video printer using the control panel, or you can transfer the report to the USB or RS-232C port by selecting the **Send Report** button on the report page.


System Reference	
System Presets	Ch 3
Printer Installation	Ch 5

## Video Printer (On-board)

Use the system presets to assign a documentation control to the printing function.

### To print the report to an on-board video printer:

- Press a documentation control on the control panel that is configured for the print function.  
The system transfers the information displayed on-screen to the specified documentation device.


<b>F4</b>
System Configuration
▶ Peripheral
▶▶ RS-232
▶▶ USB
▶ Customize Keys

## Peripheral Printer (Off-board)

Use the system presets to assign functionality to the serial port or to a USB port as the destination for data sent through the system.

### To send data to a USB port or the RS-232C port:

- Roll the trackball to the **Send Report** button on the report and then press the **SET** key on the control panel.  
The **Send Report** button is changed to the **Cancel** button.

### To cancel the Send Report command:

- To interrupt immediately, roll the trackball to the **Cancel** button and then press the **SET** key.

## Ending an Exam

You can complete the patient examination from the DIMAQ-IP Image screen or Study screen.

Use system presets to automatically store report data to the internal hard disk drive when you close the study.

### To access the DIMAQ-IP screens (Study screen and Image screen):

1. Press the **REVIEW** key on the control panel.  
If a patient is currently registered, then the system displays the Image screen. If there is not a patient currently registered, then the system displays the Study screen.
2. To display the Image screen (from the Study screen), select the **Image Screen** button on the left of the screen.
3. To display the Study screen (from the Image screen), select the **Study Screen** button on the left of the screen.

### To complete the patient examination, choose one of the following:

- Select the **Close Study** button on the left of the Image screen and then select **OK** to confirm the operation.
- Select the **Close** or **New** button in the **Study** box on the right of the Study screen and then select **OK** to confirm the operation.
- Press the **F1** key on the keyboard to begin a new examination and select the **OK** button to register the new patient.
- Shut down the ultrasound system.

#### System Reference

System Presets Ch 3



#### F4

M&R

► Report Data Auto Store

## 6 Technical Description

---

<b>Standard Features .....</b>	<b>3</b>
Operator Control Panel .....	3
Multi-Lingual System Operating Software .....	3
Processing Power .....	3
High Resolution Color Monitor .....	4
Mobility .....	4
Transducer Compatibility .....	4
User-Accessible Connections .....	5
Operating Modes .....	6
Single Modes .....	6
Mixed Modes .....	6
Imaging Functions .....	7
Pulsed Wave Doppler and Continuous Wave Doppler .....	7
Color Doppler .....	9
Power Doppler/Directional Power Doppler .....	10
<b>Options .....</b>	<b>11</b>
<b>Measurements, Calculations, and Reports .....</b>	<b>12</b>
General Functions .....	12
General 2D-Mode Measurements and Calculations .....	12
General M-Mode Measurements and Calculations .....	12
General Doppler Measurements and Calculations .....	13
Exam-Specific Measurements and Calculations .....	14
Abdominal .....	14
Surgical .....	14
Breast .....	14
Thyroid .....	14
Testicle .....	14
Gynecology .....	14
Urology .....	14
Obstetrics .....	15
Orthopedic .....	16
Cerebrovascular .....	16
Peripheral Vascular .....	16
Venous .....	16
Cranial .....	16
Cardiac .....	16
Emergency Medicine .....	17
OB M&R Package Option .....	17

Measurement Accuracy .....	18
Linear Measurements on a Multi-Planar Image .....	19
Area Measurements on a Planar Quadrant.....	19
<b>Image Display .....</b>	<b>20</b>
<b>System Requirements.....</b>	<b>22</b>
Power Supply Requirements.....	22
Possible Combinations with Other Equipment .....	22
Leakage Currents .....	22
Audio, Video, and Data Transmission Connections ■ Input and Output Signals.....	23
Environmental Requirements .....	24
Protective Measures .....	24
Maximum Physical Dimensions .....	24
<b>System Classifications .....</b>	<b>25</b>
<b>Standards Compliance.....</b>	<b>26</b>



## Standard Features

### Operator Control Panel

- Trackball
- Backlit controls and keys
- Language-specific control panel overlays
- High-resolution Liquid Crystal Display (LCD) with dedicated function keys
- Alphanumeric keyboard with special function keys

### Multi-Lingual System Operating Software

- Windows®-based operating software
- Multi-language capability, selectable during software installation
- User-modifiable system presets, including libraries of annotations and pictograms
- QuickSet™ feature for defining up to 32 sets of specific exam, transducer, and image parameter settings

### Processing Power

- DIMAQ-IP integrated workstation
- Crescendo™ Multi-Dimensional Image Processor integrated to DIMAQ-IP architecture
- SynAps™ synthetic aperture technology for improved image quality at depth
- Signal processing hardware that allows parallel and quad signal processing
- Pathway for future performance expansion and technological innovations

## High Resolution Color Monitor

- 38 cm (15-inch)
- MultiSync, progressive scan (non-interlaced) with 800 x 600 pixel display matrix
- Tilt of 10° up and 8.5° down
- Swivel of 180°
- Brightness, contrast, and degauss controls
- Built-in stereo speakers
- Energy savings compliant per VESA Display Power Management Signaling<sup>1</sup> standard

## Mobility

- Mobile console with swivel wheels and brakes for transport
- Large front and rear steering handles for ease in mobility

## Transducer Compatibility

- 2.0 to 12.0 MHz imaging range capability
- Wideband MultiHertz™ multiple frequency imaging
- Hanafy Lens transducer technology
- Transducer Ports:
  - Two standard array transducer ports and one optional array transducer port
  - One auxiliary continuous wave transducer port<sup>1</sup>
- Detachable transducer and gel holders
- Transducer cable management
- microCase™ transducer miniaturization technology for increased user comfort and reduced fatigue
- Lightweight, ergonomic transducer design with SuppleFlex™ cables

---

<sup>1</sup> Not for use with SONOVISTA systems

## User-Accessible Connections

- CD/DVD combination drive for user presets, system software updates and upgrades, and patient data and image storage/retrieval and for use with the DIMAQ-IP integrated ultrasound workstation
- On-board location for up to three image recording devices (analog output)
- One RS-232C port (to control VCR/DVR operation or data transfer to an off-board printer or PC) and one VGA connector (for output to an external monitor)
- USB port for off-board printer connectivity
- Ethernet port
- User-programmable, dual-pedal footswitch (optional)

## Operating Modes

The following modes are available on the system:

### Single Modes

- 2D-mode, Dual mode, 4B-mode, and Split (B+B) mode in fundamental and harmonics
- M-mode
- A-mode
- Color Doppler
- Power and Directional Power Doppler
- Pulsed Wave Doppler
- Steerable Continuous Wave Doppler (Requires the Cardiac Imaging Option)
- Continuous Wave Doppler (non-steerable)<sup>1</sup>(Requires the Cardiac Imaging Option)

### Mixed Modes

- 2D/M-mode
- 2D/Doppler
- M/Doppler
- 2D/M-mode with Doppler
- 2D-mode with color (2D-mode with power)
- Dual-mode with color (Dual-mode with power)
- 4B-mode with color (4B-mode with power)
- Split-mode with color (Split-mode with power)
- 2D-mode with color/Doppler (update and triplex)
- 2D-mode with color/M-mode with color/Doppler
- M-mode with color
- M-mode with color/Doppler

#### **[1] Instructions for Use**

Color formats	6-9
---------------	-----

---

<sup>1</sup> Not available for SONOVISTA systems

## Imaging Functions

- 2D-mode and M-mode imaging with mixed modes for 2D/M and A-mode display
- Gray scale coloring for the 2D-mode image, M-mode sweep, and/or spectral Doppler waveform
- 256 gray shade display with selectable gray maps:
  - L, B, G, C, S, D, A, E
- Up to 22 choices for magnification in frozen or real-time imaging
- 20 mm to 240 mm depth of view display in 10 mm increments (transducer dependent)
- User-adjustable single, dual, and quadruple focusing
- CINE:
  - Up to 511 gray scale frames or 511 color image frames
- Zoom
- Ensemble™ Tissue Harmonic Imaging (THI)
  - Available on these transducers: L10-5, P4-2, P9-4, CH5-2, C6-3 3D/C6F3, and C6-2

## Pulsed Wave Doppler and Continuous Wave Doppler

- Doppler measurements and calculations, including a calculation and report package for cerebrovascular, peripheral vascular and venous exams
- Spectral Display processing in four selections
- Full screen spectral waveform trace display
- Spectral waveform trace display for Maximum, Minimum, Mean, and Mode values
- Spectral invert
- Adjustable spectral baseline in nine positions
- Sweep speed adjustment
- High PRF

## Pulsed Wave Doppler

- Pulsed wave Doppler display with mixed-mode scanning in 2D/Doppler, M-mode/Doppler, 2D/M-mode/Doppler, and full screen Doppler
- Pulsed Doppler transmit frequencies of 2.1 MHz, 2.6 MHz, 3.5 MHz, 4.5 MHz, 5.2 MHz, and 7.0 MHz
- Simultaneous 2D-mode and Doppler display
- 2D/Doppler Refresh, Update, and Triplex functions
- Downshift frequency and High-PRF Doppler
- User-selectable display format for 2D/Doppler imaging mode (and 2D/M-mode)
- Adjustable Doppler Gate size
- Flow angle correction on real-time or frozen images, with velocity readout update
- User-selectable frequency (kHz) and/or velocity (m/s or cm/s) display format
- Seven Wall filter selections, PRF dependent
- Doppler Search Mode for audio without spectral display
- PRF control from 1.4 kHz to 15.3 kHz

## Continuous Wave Doppler (Auxiliary CW)

(Requires the Cardiac Imaging Option)

(Not available for SONOVISTA systems)

- Continuous Wave transducer frequency of 2.0 MHz and 5.0 MHz
- Seven Wall filter selections, PRF dependent
- PRF control from 4.0 kHz to 47.6 kHz

## Steerable Continuous Wave Doppler

(Requires the Cardiac Imaging Option)

- Steerable continuous wave transducer frequency of 2.1 MHz, 2.6 MHz, 3.7 MHz, and 5.0 MHz
- Seven Wall filter selections, PRF dependent
- PRF control from 4.0 kHz to 47.6 kHz

## Color Doppler

- AutoColor with High, High/Medium, Medium, Medium/Low and Low Flow settings
- Parallel or Quad Signal processing – transducer dependent
- Motion Cut, Persistence, Temporal Averaging, Noise Cut, and Density
- Adjustable color window (size and position)
- Color Gain
- Color Peak Hold
- Color Pulse Repetition Frequency (PRF)
- Zoom for 2D-mode with color, 2D-mode with color/M-mode with color, and 2D-mode with color/Doppler
- Color Maps: Four Velocity Maps and four Velocity + Variance Maps (VV)
- Color invert
- Color Baseline Shift in 17 steps
- Color correction for flow angle adjustment
- 2.1 to 7.0 MHz Color Flow Doppler transmit frequency range
- Linear array transducer beam steering up to  $\pm 22^\circ$
- Color Triplex or Update function
- Velocity Tag (point velocity or range of velocities)

## Color Flow Formats

- 2D-mode with color flow in 2D image (Bc)
- M-mode with color flow in M sweep (Mc)
- 2D/M-mode with color flow in 2D image and M sweep (2Dc/Mc)
- 2D/Doppler with color flow in 2D image (2Dc/Doppler or triplex)
- M/Doppler with color flow in M sweep (Mc/D)
- Dual with color flow in active 2D image (2Bc)
- 4B-mode with color flow in active 2D image
- Split mode with color flow displayed in the active image

## **Power Doppler/Directional Power Doppler**

- Power gain from 0 to 30 dB in 1 dB increments
- Motion Cut, Persistence, Temporal Averaging, Noise Cut, and Density
- Five flow control settings
- Zoom for 2D-mode with power and 2D-mode with power/Doppler
- 2.1 to 7.0 MHz Power Doppler transmit frequency range
- Directional power maps
- Adjustable power window size and position
- Selectable flash level of tissue motion discrimination
- Five Power mode color maps
- Parallel or Quad signal processing, transducer dependent



## Options

- Stress Echo (requires the Cardiac Imaging Option and the P4-2 transducer)
- DICOM Connectivity Option
- DICOM Modality Worklist Option (requires the DICOM Connectivity Option)
- DICOM MPPS Option (requires the DICOM Connectivity Option)
- DICOM Structured Reporting for Obstetrics/Gynecology
- Dual footswitch
- SieScape™ Panoramic Imaging Option
- *fourSight*™ 4D Imaging Option
- Axiu™ Automatic OB Calipers Option
- Cardiac Imaging Option (includes ECG, steerable CW, and Cardiac measurement and report capability)
- TGO™ Tissue Grayscale Optimization Option
- Additional Array Port Option

# Measurements, Calculations, and Reports

Two categories of measurements and calculations are available on the ultrasound system: general and exam-specific.

## General Functions

- 2D-mode and M-mode imaging have up to eight (8) distance sets of caliper measurements per image  
Area and circumference: up to eight Ellipse, Trace, Spline, and Cross measurements per image
- Doppler has up to eight (8) points available on the waveform display
- Ratio Calculations

## General 2D-Mode Measurements and Calculations

- Angle
- Distance/Depth
- Circumference (using a Trace, Ellipse, Spline, or Cross method)
- Area (using a Trace, Ellipse, Spline, or Cross method)
- Volume (using a 2-Plane Volume or a 1-Plane Volume)
- Residual Volume and Thyroid Volume
- Flow Volume (using an Area or Diameter method with a Doppler measurement)

## General M-Mode Measurements and Calculations

- Distance
- Time
- Heart Rate
- Slope
- Flow Volume (using a Diameter method with a Doppler measurement)
- Ratio Calculations

## General Doppler Measurements and Calculations

- Velocity (Frequency)
- Ratio Calculations
- Peak Pressure
- Point Values
- Heart Rate
- Average Values
- Time
- Area Flow Volume
- Slope – Acceleration/Deceleration
- Diameter Flow Volume
- Resistive Index
- Pulsatility Index
- Systolic/Diastolic Ratio

## Exam-Specific Measurements and Calculations

The measurement function is arranged by exam type and is available for use with all exam types.

### Abdominal

- All general measurements and calculations

### Surgical

- All general measurements and calculations

### Breast

- All general measurements and calculations

### Thyroid

- All general measurements and calculations
- Thyroid volume

### Testicle

- All general measurements and calculations

### Gynecology

- All general measurements and calculations
- Right and left follicle, uterus, and right and left ovary measurements
- Gynecology patient report

### Urology

- All general measurements and calculations
- Micturated volume
- Prostate dimensions
- Prostate and urology patient report

## Obstetrics

- All general measurements and calculations
- Early OB and Standard OB parameter labels
- Early OB and Standard OB measurement labels
- Menstrual Age parameter labels
- Up to five user-defined Menstrual Age formulas or tables
- Up to five user-defined ratios of parameters
- Up to five user-defined Growth Analysis formulas or tables
- Up to five user-defined measurement labels are available in 2D-mode
- Calculations for parameters and estimated fetal weight (EFW)
- Calculations for both clinical and ultrasound menstrual age, and estimated date of confinement
- One table and one formula per parameter is available for menstrual age calculation
- Two system-defined formulas for estimating fetal body weight: EFW1 and EFW2
- Up to five user-defined formulas for estimating fetal body weight
- Two formulas for composite ultrasound menstrual age calculation: Direct/Average, system-defined
- Early Obstetric patient report and Standard Obstetric patient report include a worksheet for viewing the progress of the report during the exam process and to edit the report, along with multiple fetus reporting capabilities
- Growth Analysis Graphs
- One user-defined Doppler measurement label

### [2] Instructions for Use

Obstetrics	Ch B2
------------	-------

## **Orthopedic**

- All general measurements and calculations
- Right and Left Hip Angle measurement
- Orthopedic report

## **Cerebrovascular**

- All general measurements and calculations
- CCA, ICA1, ICA2, ICA3, ECA, and VA measurements
- Cerebrovascular patient report
- Area Percent Stenosis and Diameter Percent Stenosis measurements

## **Peripheral Vascular**

- All general measurements and calculations
- Distance measurement

## **Venous**

- All general measurements and calculations
- Right and left measurements
- Venous patient report

## **Cranial**

- All general measurements and calculations

## **Cardiac**

(Requires the Cardiac Imaging Option)

- 2D-mode Trace, Distance, and Angle measurements
- Nine volume formulas for Left Ventricular function assessment
- 2D-mode, M-mode, and Doppler calculations
- M-mode Slope, Heart Rate, Time, and Distance measurements
- Doppler Acceleration, Deceleration, Trace, Heart Rate, Time, and Velocity measurements
- Cardiac worksheet and patient report

## Emergency Medicine

The Emergency Medicine (EM) package includes measurements, calculations, and patient reports for assessing:

- Dimensions of abdominal organs: Gall bladder wall, bile duct, and aorta
- Cardiac function: End-diastolic and end-systolic volumes and the derived ejection fraction
- Fetal Growth: Gestational sac, crown-rump length, and biparietal diameter
- Bladder dimensions for the transverse and sagittal planes

## OB M&R Package Option

(For SONOVISTA systems only)

- All general measurements and calculations
- User-selectable formula sets for Tokyo, Osaka, and JSUM exams:
  - Estimation of menstrual age
  - Estimation of fetal weight
  - Calculation of growth ratios
- Obstetric-specific calculations:
  - Amniotic Fluid Index
  - Cardio-Thoracic Area Ratio
  - Fetal Heart Rate
- Obstetric-specific parameter, measurement, and calculation labels
- User-selectable primary and secondary references for the **User1** and **User2** formula sets
- User-selectable measurement methods for X, Y, and Z measurements
- Supports multiple gestation studies
- Clinical menstrual age calculated by user-entered **LMP/EDC** or direct user input in **Fetal Age** field on patient registration form
- Display of clinical menstrual age (**AGE**) and estimated date of confinement (**EDC**) at top of image screen
- Measurement menu displays labels with values and a date indicating estimation of US MA
- Measured Results display lists the values, standard deviation (SD), and resulting estimations of dates for US MA (**AGE**) and US EDC (**EDC**)
- Editable patient report
- Growth Analysis Graphs

## Measurement Accuracy

The following table describes the variability in accuracy for each parameter:

Parameter	Ranges	Accuracy
Image Depth Scale	20 to 240 mm 30 to 240 mm	< $\pm 3\%$ or < 1 mm, if below 33 mm < $\pm 3\%$ of full scale
ECG/Image Time Scales	2, 4, 8, 16 sec.	< $\pm 5$ ms
<b>Two-dimensional Measurements</b>		
– Distance/Depth	up to 240 mm	< $\pm 3\%$ or < 1 mm, if below 33 mm
– Area	up to 999 cm <sup>2</sup>	< $\pm 6\%$ or < 66 mm <sup>2</sup> , if below 11 cm <sup>2</sup>
– Trace (Ellipse)	up to 999 cm <sup>2</sup>	< $\pm 6\%$ or < 66 mm <sup>2</sup> , if below 11 cm <sup>2</sup>
– Angle	0° to 180°	< $\pm 3\%$ on ½ segment
– Ratio (A/B)		
Result B/A & (A-B)/A	up to 1.0	< $\pm 10\%$ of A
Result A/B	1.0 to 99.9	< $\pm 10\%$ of A
<b>Time Motion (TM) Measurements</b>		
– Depth	up to 240 mm	< $\pm 3\%$ or < 0.5 mm, if below 17 mm
– Time	up to 16 sec.	< $\pm 2\%$
– Heart Rate	15 to 999 bpm	< $\pm 5\%$
– Velocity	up to 999 mm/sec.	< $\pm 5\%$
<b>Volume Measurements</b>		
– Volume (Area, Length, Diameter)	up to 999 cm <sup>3</sup>	< $\pm 9\%$ or < 3.2 cm <sup>3</sup> , if below 36 cm <sup>3</sup>
– Thyroid Volume	up to 999 cm <sup>3</sup>	< $\pm 9\%$ or < 3.2 cm <sup>3</sup> , if below 36 cm <sup>3</sup>
– Urine Remainder	up to 999 ml	< $\pm 9\%$ or < 3.2 cm <sup>3</sup> , if below 36 cm <sup>3</sup>
– Prostate Volume	up to 999 cm <sup>3</sup>	< $\pm 9\%$ or < 3.2 cm <sup>3</sup> , if below 36 cm <sup>3</sup>



## Linear Measurements on a Multi-Planar Image

The measurement accuracy tables are based on the worst-case linear measurements for a multi-planar image.

### Transducer: C6-3 3D/C6F3

**Scan Speed = 1, 2, 3, 4**

**Note:** Measurements are not available for volumes acquired with the **Scan Speed** setting of **5**.

Depth	Measured Length		
	20 mm	40 mm	60 mm
80 mm	within $\pm 5.8$ %	within $\pm 5$ %	within $\pm 5$ %
160 mm	within $\pm 10.5$ %	within $\pm 5$ %	within $\pm 5$ %
240 mm	within $\pm 13.2$ %	within $\pm 5$ %	within $\pm 5$ %

## Area Measurements on a Planar Quadrant

**Note:** Area measurements are only possible on a planar quadrant (slices). You cannot perform an area measurement on the volume quadrant.

The measurement accuracy tables are based on the worst-case linear measurements for a planar quadrant.

### Transducer: C6F3/C6F3

**Scan Speed = 1, 2, 3, 4**

**Note:** Measurements are not available for volumes acquired with the **Scan Speed** setting of **5**.

Depth	Measured Area		
	20 x 50 mm	20 x 60 mm	50 x 60 mm
80 mm	within $\pm 11.1$ %	within $\pm 11.1$ %	within $\pm 10.3$ %
160 mm	within $\pm 16.1$ %	within $\pm 16.1$ %	Within $\pm 10.3$ %
240 mm	within $\pm 18.9$ %	within $\pm 18.9$ %	Within $\pm 10.3$ %

## Image Display

Video Standards:	EIA/NTSC and CCIR/PAL
Monitor:	Color 38 cm (15"), non-interlaced, MultiSync (SVGA)
Gray Scale:	256 levels
Color:	Up to 16.7 million colors
Image polarity:	Positive (black on white) or negative (white on black)
Date/Time display:	System displays current date and time above the imaging area. Clock freezes in frozen image. Daylight saving time changes available in system presets.
Image field size: (by frequency)	3.5 MHz = 20 to 240 mm 5.0 MHz = 20 to 240 mm 7.5 MHz = 20 to 240 mm 10.0 MHz = 20 to 240 mm 12.0 MHz = 20 to 240 mm  The depth is selectable in increments of 10 mm. Minimum and maximum depth values for each frequency are transducer dependent.
Image Orientation:	Left-to-right or right-to-left orientation for 2D, Split (B+B), Dual, and 4B modes; 2D image in mixed 2D/M-mode and Doppler. Active image indicator designates direction of scan. 90-degree rotation for 2D, Split (B+B), Dual, and 4B modes; 2D image in 2D/D-mode and 2D/M-mode.
Image Position:	Image can be offset vertically and horizontally
Other Imaging Parameters:	Transmit power displayed in decibels (dB) or percentage (%)  Overall System Receiver Gain combined with DGC Gain totals 60 dB  Independent Receiver Gain for 2D/M-mode, Color, Power, and Doppler  Depth Gain Compensation (DGC) – Eight DGC slide controls for DGC Gain  Pre-processing – Edge Enhancement in four steps; Image Persistence in six steps; Dynamic Range 35 to 70 dB in 1-dB steps.  Post-processing – Variable grayscale compression maps: L, B, G, C, S, D, A, E,  Focusing – 1, 2, and 4 transmit focal zones for all electronic array transducers; number and position of focal zones are user-selectable

Image Screen Display:	<p>Millimeter (mm) scale marker with depth of display, focal zones: number and position, gray bar, trackball arbitration, active image indicator, error and help messages.</p> <p>Values for the following image parameters: 2D/M Gain, Dynamic Range, Edge Enhancement, Doppler Wall Filter, Doppler Gate Size, Doppler Gate Depth, Doppler Gain, Doppler Flow Angle, Transmit Power for 2D/M and Doppler, Color and Power Persistence, Filter and Gain.</p> <p>Active transducer and transmit frequency, exam type, active measurement method, Measurement Menu, Measured Results.</p>
Patient Data Form:	Fields for identification of the patient and physician.
Text Annotation:	Customize phrase libraries for patient reports and on-screen annotation. You can directly enter text on the image screen using the keyboard.
Pictograms:	Standard and exam-specific graphics representing anatomical structures are user selectable. Transducer position and orientation are also available for positioning on the pictograms.

## System Requirements

This section describes the power and environmental requirements for the ultrasound imaging system.

### Power Supply Requirements

MAINS Voltage	Range	Maximum Current	Frequency
100V~ to 120V~	90V~ to 138V~	10.5 to 8.8 amps	50/60 Hz
220V~ to 240V~	195.5V~ to 264.5V~	4.8 to 4.5 amps	50/60 Hz

### Possible Combinations with Other Equipment

Only the peripheral devices listed in the *System Reference* are approved for use with the ultrasound system. Any use of other devices with the system will be at the user's risk and may void the system warranty.

#### System Reference

Accessories and Options	Ch 2
----------------------------	------

On-board peripheral devices must be installed by an authorized Siemens representative or approved third party.

**⚠ WARNING:** Accessory equipment connected to the analog and digital interfaces must be certified according to the respective EN and IEC standards (e.g., EN 60950 and IEC 60950 for data processing equipment and EN 60601-1 and IEC 60601-1 for medical equipment). Furthermore, all configurations shall comply with the system standards EN 60601-1-1 and IEC 60601-1-1. Anyone who connects additional equipment to the signal input or signal output ports configures a medical system and is therefore responsible that the system complies with the requirements of the system standards EN 60601-1-1 and IEC 60601-1-1. Siemens can only guarantee the performance and safety of the devices listed in the Accessories and Options chapter. If in doubt, consult Siemens service department or your local Siemens representative.

### Leakage Currents

**⚠ WARNING:** Connecting peripheral products and accessories from non-isolated sources may result in chassis leakage current exceeding safe levels.

## Audio, Video, and Data Transmission Connections ■ Input and Output Signals

Input/Output	Connector
Composite Video	BNC-type (1 input, 2 output)
Y/C Video	S-terminal (1 input, 2 output)
2 Channel Audio (Right, Left)	RCA-type (2 input, 2 output)
RGB	BNC-type (1 input, 1 output)
USB	Series A type
Ethernet	RJ45
ECG connector	For ECG leads
ECG external DC input <sup>1</sup>	Phone jack
RS-232-C port for printer/VCR/DVR/PC communication	9-pin, female (1)

Output	Connector
RGB/Composite Synchronous	15-pin (1)
VGA	15-pin, female (1)
Remote printer connector	Mini-jack (stereo) (2 jacks)
B/W Video	BNC-type

<sup>1</sup> Not for use with SONOVISTA systems

## Environmental Requirements

**Note:** For SONOVISTA systems only:

The 3.5C55S transducer is the equivalent of the C6-2 transducer.

The 3D-ABD transducer is the equivalent of the C6F3 transducer.

The 6.5EV13 transducer is the equivalent of the EV9-4 transducer.

**EMC NOTE:** Operating the ultrasound imaging system in close proximity to sources of strong electromagnetic fields, such as radio transmitter stations or similar installations, may lead to interference visible on the monitor screen. However, the device has been designed and tested to withstand such interference and will not be permanently damaged.

	During Operation	Ambient (During Storage or Transportation)
<b>Maximum Altitude:</b>	Operation up to 3,000 meters (700 hPa to 1060 hPa)	
<b>Relative humidity:</b>	30% to 85%, non-condensing	<= 95%
<b>Temperature:</b>		
<b>System</b>	+10°C to +40°C*	-10°C to +60°C
<b>Array Transducers</b>		
<b>BE9-4</b>	+10°C to +40°C	-10°C to +60°C
<b>EC9-4</b>	+10°C to +40°C	-40°C to +60°C
<b>C6-2</b>	+10°C to +40°C	-10°C to +60°C
<b>CH5-2</b>	+10°C to +40°C	-40°C to +60°C
<b>L10-5</b>	+10°C to +40°C	-10°C to +60°C
<b>EV9-4</b>	+10°C to +40°C	-10°C to +60°C
<b>VF13-5</b>	+10°C to +40°C	-10°C to +60°C
<b>VF13-5SP</b>	+10°C to +40°C	-10°C to +60°C
<b>P9-4</b>	+10°C to +40°C	-40°C to +60°C
<b>P4-2</b>	+10°C to +40°C	-10°C to +60°C
<b>5.0L45</b>	+10°C to +40°C	-10°C to +60°C
<b>7.5L70</b>	+10°C to +40°C	-10°C to +60°C
<b>5.0C50+</b>	+10°C to +40°C	-10°C to +60°C
<b>C8-5</b>	+10°C to +40°C	-10°C to +60°C
<b>C6-3 3D/C6F3</b>	+10°C to +40°C	-5°C to +50°C
<b>Pencil CW Transducer</b>		
<b>CW2<sup>1</sup></b>	+10°C to +40°C	-40°C to +60°C
<b>CW5<sup>1</sup></b>	+10°C to +40°C	-40°C to +60°C

\*The maximum operating temperature for the CD/DVD drive is up to +35°C.

## Protective Measures

**Explosion protection:** This product is not designed for operation in areas subject to explosion hazards.

## Maximum Physical Dimensions

**Width:** 510 mm  
**Height:** 1422 mm  
**Depth:** 798 mm  
**Weight:** 120 kg, without documentation devices

<sup>1</sup> Not available for SONOVISTA systems

## System Classifications

The G60 S ultrasound imaging system has the following classifications:

- Type of protection against electrical shock:  
Class I
- Degree of protection against electrical shock:  
Type B equipment  
Type BF for ECG connection
- Degree of protection against harmful ingress of water:  
Ordinary equipment
- Degree of safety of application in the presence of a flammable anesthetic material with air or with oxygen or nitrous oxide:  
Equipment not suitable for use in the presence of a flammable anesthetic mixture with air or with oxygen or nitrous oxide.
- Mode of operation:  
Continuous operation

## Standards Compliance

The G60 S ultrasound imaging system is in compliance with the following standards, including all applicable amendments at the time of product release.

### Quality Standards

- FDA QSR 21 CFR Part 820
- ISO 13485:2003
- EN 46001:1996

### Design Standards

- UL 60601
- CSA C22.2 No. 601.1
- EN 60601-1 and IEC 60601-1
- EN 60601-1-1 and IEC 60601-1-1
- EN 60601-1-2 and IEC 60601-1-2 (Class B)
- EN 60601-2-25 and IEC 60601-2-25
- EN 60601-2-37 and IEC 60601-2-37
- JIS T 0601-1:1999 (for SONOVISTA systems only)
- JIS T 0601-1-1:2005 (for SONOVISTA systems only)
- JIS T 0601-2-37:2005 (for SONOVISTA systems only)

### Acoustic Output Standards

- IEC 61157 (Declaration of Acoustic Power)
- AIUM/NEMA UD-2, 1998 Acoustic Output Measurement Standard for Diagnostic Ultrasound
- AIUM/NEMA UD-3, 1998 Standard for Real-Time Display of Thermal and Mechanical Acoustic Output Indices on Diagnostic Ultrasound Equipment

### CE Declaration

For systems affixed with a CE mark: This product is provided with a CE marking in accordance with the regulations stated in Council Directive 93/42/EEC of June 14, 1993 concerning Medical Devices. Siemens Medical Solutions USA, Inc., is certified by Notified Body 0123 to Annex II.3 – Full Quality System.

Authorized EC Representative:  
Siemens Aktiengesellschaft  
Medical Solutions  
Henkestraße 127  
D-91052 Erlangen  
Germany